IDG.com

**Contemplating Nortel** Nortel's woes have users such as New York State Court CTO Sheng Guo worried. **PAGE 11.**

**Web chaos** Consolidating Web sites can save IT costs and simplify administration. **PAGE 19.**

NetworkWorld

The leader in network knowledge ■ www.nwfusion.com

November 26, 2001 ■ Volume 18, Number 48

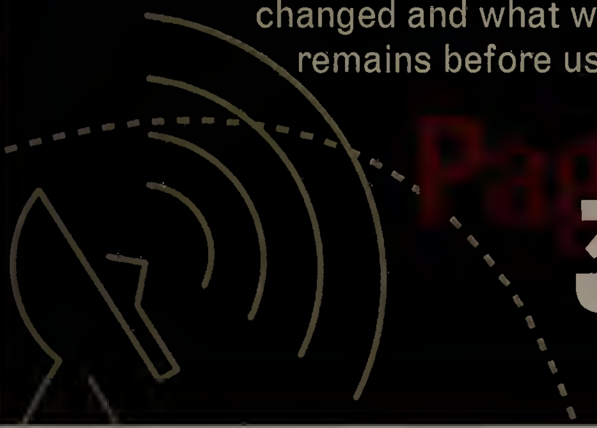
SPECIAL REPORT

## Safety nets

Technology's role in Sept. 11 and where we go from here

Networks played a multifaceted role in the events of **Sept. 11** and the aftermath. They were central to the orchestration of the attacks, they helped stricken companies cope with the disaster, and they are at the heart of a lingering vulnerability — cyberterrorism.

Here's a look at the **upsides** and **downsides** of network technology, what has already changed and what work remains before us.



Page 36

### Net execs plotting strategies to counter

# E-card deluge

■ **BY JOHN FONTANA**

Thanksgiving may have passed but IT executives still face the task of slaying the real holiday turkey: the annual onslaught of electronic holiday greetings.

Fortunately, IT may be better prepared this year after months of fighting vicious e-mail-borne worms and viruses such as Anna Kournikova, Nimda and Sircam.

Tools used to fight those battles — content-filtering and antivirus software, and human engineering — should help ease the drag on bandwidth and storage from whimsical holiday greeting cards, zany holiday games, animations and screensavers exchanged with e-mail.

Last year's favorite e-mail attachment was the Elf Bowling game, a 1M-byte executable file in which Santa uses a 16-pound ball to mow down screaming elves.

Jolly ol' St. Nick also mowed down e-mail systems. "Making the rounds last year was a large PowerPoint file over 1M byte [in size] that was an animation of Santa and his reindeer flying across the screen," says Peter Thrall, manager of global messaging for Ingersoll Rand.

"Our mail traffic in December doubled, and our servers crashed a couple of times," he says.

This year's favorite e-mail clogger hasn't emerged, but the traffic spikes could be worse given concerns over postal mail and anthrax.

In December, some greeting card sites anticipate a 60% increase in use, some e-mail administrators expect to see nearly a 50% rise in traffic and 100% increase in average message size, and content-filtering service providers say the number of inappropriate messages they block will rise by 25%.

Ingersoll Rand's Thrall has signed up for EasyLink's

See E-cards, page 8

**Mailbag**

E-greeting card vendor Regards.com expects to deliver more than **1.5 million** holiday cards during the month of December.

# File delivery's next big thing?

NetWare inventors' start-up to focus on moving large files across 'Net.

■ **BY DENI CONNOR AND JENNIFER MEARS**

SOUTH JORDAN, UTAH — Drew Major, known as the Father of NetWare, sees the future of the Internet and there's nothing small about it.

His latest venture, XLON Technologies — as in Xtra Large Object Network — is focused on moving multimedia and other increasingly big files across the Internet more quickly and economically than is otherwise possible. The new service provider will use a combination of off-the-shelf caching products and its own technology to deliver files that are 1M byte or larger via multiple sources. These sources include the content's origin server, XLON-owned proxies, caches on partner ISP networks and even client programs on desktop computers.

While Major was unavailable for comment on his secretive new company, for which he provided the initial undisclosed funding and serves as chairman, he's clearly become a mover and

See XLON, page 10

**With his latest company, XLON, Drew Major is looking to improve content delivery.**

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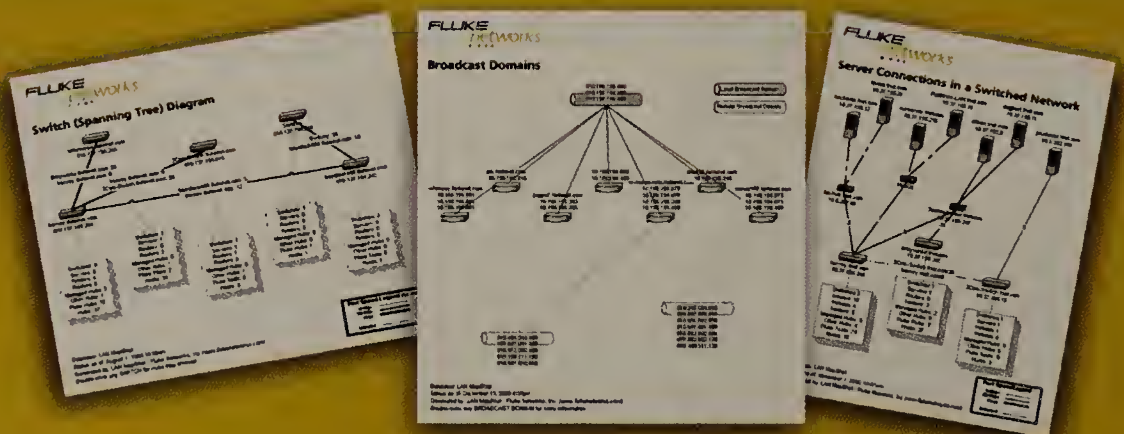
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## News

- **8 Computer Associates** bolsters software agents with release of products aimed to give users more intelligent software.
- **8 Bear Stearns** to monitor all-IP network with Sniffer mgmt. tools.
- **10 Aprisma** customizes **Spectrum** by adding rules-based event correlation and impact analysis.

## Infrastructure

- **11** Enterprise customers wary of Nortel's woes.
- **11** NetBotz surveys physical environment.
- **12 Kevin Tolly:** A few words on campus wireless.
- **16** Vendors drive down copper Gigabit Ethernet prices.

## Enterprise Applications

- **19** Taking control of Web chaos.
- **19** ConfigureSoft helps soothe patch headaches created by Microsoft.
- **20 Scott Bradner:** Postponing the inevitable.

## Net.Worker

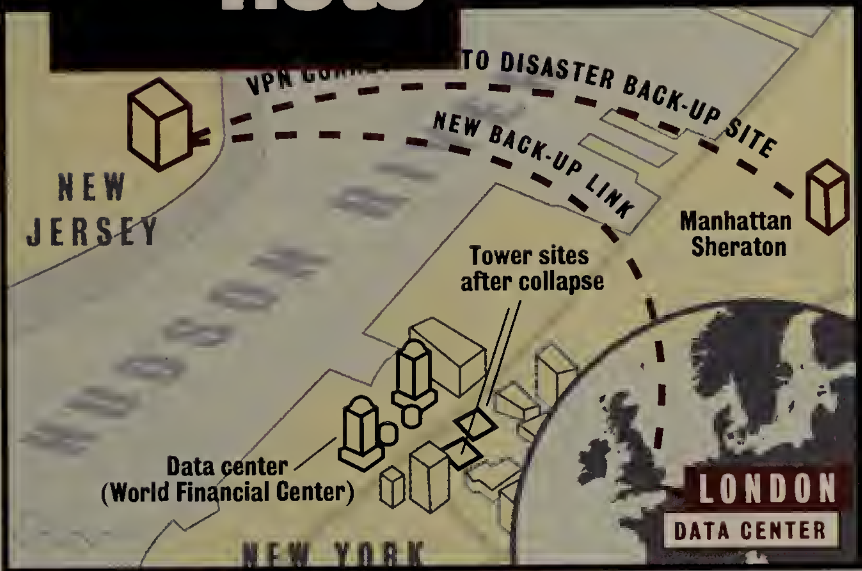
- **23 Review:** Five Gigabit Ethernet starter kits put through their paces.

## Service Providers

- **25** An interview with the head of IBM's e-business hosting services.
- **25** Frame relay serves Paxson Communications well.
- **26 Lisa Pierce:** Cingular-VoiceStream joint venture ought to be a merger.

SPECIAL REPORT

## Safety nets



The events of Sept. 11 fundamentally changed the way that companies think about disaster recovery, data backup and cyber security. In this special report, we examine the readiness of the nation's networks and provide disaster-recovery tips.

**Lehman Brothers' disaster recovery**
Bob Schwartz, CTO at Lehman Brothers, triggered the company's disaster-recovery plan while racing down the stairwell from the 40th floor of the World Trade Center. **Page 36.**

**Security in the spotlight**
Security takes center stage at U.S. companies. **Page 42.**

**The terrorist network**
A look at the ways that the Al Qaeda network uses technology to communicate around the world. **Page 48.**

## The Edge

- **27** Start-up introduces new mobile gateway.
- **27** Equipe Communications preps ATM/IP switch for MPLS.

## Technology Update

- **29** Point-to-Multipoint DWDM raises optical reach.
- **29 Steve Blass:** Ask Dr. Internet.
- **30 Mark Gibbs:** Early Christmas presents.
- **30 Keith Shaw:** It's a camera, it's a PDA, it's a phone. It's Origami!

## Opinions

- **32 Editorial:** New realities, post-9/11.
- **33 Tim Kraskey:** History repeating itself.
- **33 Linda Musthaler:** Preserving our privacy.
- **66 Backspin:** No scalability and no clues.
- **66 'Net Buzz:** Time once again to look at mail from readers.

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## Interactive

### Cool Yule Tools, after hours

Tired of all work and no play? Check out our after-hours guide to after-work fun. See what should be on your holiday gift list.
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### Flash demos

Review the history of steganography and a demonstration of how it works. Find out how service providers keep their networks up and running with fully redundant back-up network operations centers.
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### Intrusion detection

Check out our interactive Buyer's Guide online. Here you can list all the applications and then drill down into detailed spec sheets, compare two or more products in several categories and download an Excel 5.0 spreadsheet with all the data. (Note: This does not work with Internet Explorer 3.X or Lynx). **DocFinder: 7038**

### MPLS: IP's silver bullet?

Did you miss any part of our series on Multi-protocol Label Switching? Read them all here.
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## Columnists

### Compendium

iPod hacks
Fusion Executive Editor Adam Gaffin found a site dedicated to getting under the covers of the new Apple MP3 player/portable hard drive gizmo.
**DocFinder: 7040**

### Help Desk

Directories
Ron Nutter helps explain the mysteries of directories and what they do to college students.
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## NetSmart

State of the LAN/MAN seminars and resources
Events Editor Sandra Gittlen shares information and Web sites for getting up to speed on the latest wireless technologies and 10G Ethernet information. Link to the latest list of State of the LAN/MAN free one-day seminars.
**DocFinder: 7042**

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# NewsBits

## SBC taps William Daley to be president

■ Although his networking prowess is in the realm of politics and not telephony, William Daley has been named the next president of SBC Communications, the regional Bell operating company. And that may be just the kind of experience SBC needs. Daley says his top priorities will be lobbying Washington to ease up on regulations SBC says prevent it from extending broadband DSL services to 20 million users who currently cannot be served. Given that Daley was head of Al Gore's presidential campaign and before that, U.S. Secretary of Commerce, he should know how to navigate inside the Beltway. He starts work Dec. 3.

AP PHOTO/CHIEN-MIN CHUNG

**A year after leading presidential candidate Al Gore into a long and protracted election process, William Daley takes over at SBC.**

## Microsoft settles class-action lawsuits

■ Microsoft last week settled more than 100 class-action lawsuits that alleged the company had overpriced its software. The proposed settlement, filed with the Federal District Court of Maryland, calls for Microsoft to provide more than $1 billion in cash, computer hardware, software, technical assistance and training to more than 12,500 schools, 7 million economically disadvantaged students and 400,000 teachers. A public hearing on the settlement is scheduled for Nov. 27. Plaintiffs in the private antitrust lawsuits claim that Microsoft used a desktop operating system monopoly to force users to pay inflated prices for the company's software. Earlier this month, Microsoft reached a settlement in its federal antitrust case with the U.S. Department of Justice and nine state attorneys general. The remaining nine state attorneys general who were party to the action are still pressing their case for harsher penalties against the software giant.

## Windows Media Player bug surfaces, patch issued

■ A bug in the way Microsoft's Windows Media Player 6.4 handles a certain type of streaming media file can let attackers, given the right conditions, execute any code on target systems, Microsoft said in a security bulletin released last week. At the same time, Microsoft issued a fix for the problem. The hole is caused by a programming error in the way Windows Media Player 6.4 deals with Active Streaming Format (ASF) files, Microsoft said. An attacker can exploit this flaw by creating a special .asf file. If a user running the unpatched Media Player opens that file, it could cause Windows Media Player to crash or the attacker's code to run on the system, giving the attacker all of the user's privileges, Microsoft said. The scope of the problem is mitigated by the fact that the flaw cannot be exploited automatically or through e-mail and because the attacker must know — or guess — the target computer's operating system for code to be executed, Microsoft said.

## Spending on support contracts rise

■ Network equipment vendors will start offering extended service and support contracts as sales of networking products drop and companies try to maintain their current infrastructures, according to a report from market research firm IDC. Worldwide spending on network support contracts has risen by $2.1 billion to $8.4 billion in 2000, IDC says, and that figure is expected to be $14 billion by 2005. Most of the growth will come from remote diagnostics and electronic support.

## ■ The Good The Bad The Ugly

**CMGI boss David Wetherell** has ripped a page from the play book of Cisco CEO John Chambers and agreed to work next year for only $1, down from his 2001 base salary of $530,000. The Internet company incubator lost more than $5 billion during its last fiscal year, so some will see the gesture as an empty one. However, under the circumstances it beats no gesture at all. ➤

**"Blinded by the light" syndrome** has affected one-third of start-ups, according to a survey by Conversus Group that identified 16 such "deadly sins" common among early-stage companies. This syndrome refers to management teams that believe "so much in the wonder of their product or their own talents that they fail to see the realities of the marketplace," Conversus says.

**The Federal Trade Commission** last week said it has messaged about 40 Web sites warning them to stop marketing bogus bioterrorism defense products. The FTC is targeting Web site operators pitching everything from oregano oil to zinc mineral water to treat anthrax and other diseases.

## Palm and Handspring deny merger talks

■ Struggling handheld device makers Palm and Handspring strongly denied last week that they are in merger talks, the day after rumors to the contrary pushed up the stock prices for both companies. "It's not true. It's a rumor, and we don't comment on rumors," a Palm spokeswoman said. "We aren't in talks to acquire Palm or to be acquired by Palm," a Handspring spokeswoman said. Talk of a merger between the PDA makers began after a report in *The Wall Street Journal*, quoting "people familiar with the situation."

## Prices tumbling on Gigabit Ethernet gear

■ Shipments of Gigabit Ethernet ports grew slightly in the third quarter of this year, while diminishing per-port prices caused the total market revenue for Gigabit gear to shrink, according to Dell'Oro Group. Although shrinking revenue is bad news for vendors, companies are taking advantage of the falling prices of Gigabit Ethernet products to upgrade LAN backbone connections and even to deploy 1000M-bit/sec connections to desktops. According to Dell'Oro, Gigabit Ethernet port shipments grew 6% last quarter, while revenue shrank 5% worldwide. The average price for a Gigabit Ethernet port last quarter was $571, down almost $200 from a year ago. The development of copper-based Gigabit Ethernet as an alternative to traditional fiber-based products has helped to drive down prices (see related story, page 16).

## Enterasys joins 10G Ethernet market

■ The 10 Gigabit Ethernet switch Enterasys Networks announced in April finally hit the streets last week. The Matrix OAS is a 12-port Gigabit Ethernet switch with a single 10G Ethernet uplink port. Enterasys says the box can be used to link multiple backbone switches together over a single 10G-bit/sec pipe. At around $25,000, the new switch is expensive, but is priced lower than 10G Ethernet switch modules offered by Avaya, Cisco, Foundry Networks and Riverstone Networks, which cost between $40,000 and $80,000. Because the IEEE isn't due to ratify the 10G Ethernet standard until next spring, 10G Ethernet products from Enterasys and its competitors use proprietary technology based on the standard.

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# Bear Stearns to monitor all-IP network

■ **BY ELLEN MESSMER**

NEW YORK — Financial services firm Bear Stearns & Company is making its long-planned move into a new 43-floor Manhattan headquarters, which will be equipped with what still has to be considered one of the most cutting-edge network technologies: IP-based voice, data and video over Gigabit Ethernet.

To monitor what will be a massive amount of IP traffic on the LAN used by 4,300 employees, Bear Stearns will install more than 150 Sniffer Distributed network appliances from Network Associates to analyze the applications, according to Don Henderson, the firm's managing director of IT. Managing this network, built with equipment from IPC and Cisco, is expected to be simpler than managing the one Bear Stearns is leaving, which included circuit-switched communications such as ISDN. Bear Stearns says it will require far fewer network management tools and specialists.

Voice over IP is still a new approach for most firms, according to Sniffer Technologies president Bakul Mehta. He says that the latest version of Sniffer Distributed can troubleshoot voice-over-IP traffic to determine the cause of voice degradation, be it packet delay or sequencing problems, and report to the Sniffer management console.

Steps will be taken to optimize real-time reporting by running a second "overlay" network at Bear Stearns so that the Sniffer Distributed monitoring agents positioned across the intranet can quickly report to the company's remote data operations center in New Jersey.

"It's an out-of-band network we built, an overlay network, to make access to the management tools very quick and effective," says Henderson.

Bear Stearns has long operated its New York office with plenty of specialized trading terminals and phones, but no servers. Instead, the servers are stored in a New Jersey data operations facility. ■

---

**E-cards**

Continued from page 1

MailWatch, a content-filtering service. "This is the first Christmas ever where we will stop this stuff at the front door," Thrall says. He expects to handle 2 million messages in December, 500,000 more than a typical month.

Make no mistake, the e-greeting phenomenon has become an e-mail administrator's fruitcake — everyone gets them, but nobody wants them.

"There is this unexplained human behavior that turns these e-cards into a holiday multimedia event. Anthropologists should look into this phenomenon," says Bill Fallon, an EasyLink vice president.

EasyLink handles 2 million messages per day, up from 1 million per day a year ago. Fallon says holiday traffic will increase that total only a modest 2% to 5%, but the incidents of messages that are blocked will shoot up by 25%, as will the size of their payloads.

"Elf Bowling was a popular one last year. We had tens of thousands of those," Fallon says.

Some are still digging out from the blizzard.

"We are still finding some of the Elf Bowling from last year," says Dan Brinkmann, NT systems engineer for Time Warner Telecom.

But this season Time Warner is after the elves on many fronts.

Besides filtering attachments, Time Warner also is using human engineering to combat the problem.

"We have a 55M-byte storage limit and if people want to use that up with holiday cards we don't worry about it," says Brinkmann, who sees the average size of messages go from 70K bytes to 120K bytes during the holidays. When users hit that limit, they can no longer send or receive e-mail, which turns out to be an effective deterrent.

The company also has built its network to handle traffic spikes. The network's two SMTP servers with load balancing capabilities handle Internet mail.

But e-card vendors are hip to the bah-humbug reaction from e-mail administrators.

Many send only a link, such as Hallmark.com, Regards.com and e-greetings.com.

Adam Donner, director of operations for Regards.com, says the company sends out nearly 50,000 e-cards per day during the holidays, almost a 60% increase in normal traffic.

But Regards.com doesn't send messages with huge payloads.

"We only send e-mail with a link to our Web site. There is no downloading. We are completely Web-based," Donner says. But recipients need to download a plug-in for certain multimedia files if it is not already installed on their browsers.

The issue with IT is that links in e-mail can be used to lure end users into downloading malicious code from rogue Web sites, a tactic some viruses employ.

"We turn our filtering on the subject lines of these e-mails," says Tim Rhoades, network manager for the University of Washington at Bothell, who uses Sybari's Antigen for Microsoft Exchange. Many holiday e-mails have a subject line that reads "A holiday greeting from ..."

"I used to worry about the holiday cards, but I'm really confident in the protections I have put in place," he says.

So it may well be that Santa and all his electronic holiday helpers won't be so much of a nuisance this year. ■

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## Beating the holiday blues

**For e-mail administrators, the holidays are a time of spikes in messaging traffic due mostly to e-greetings such as cards and small executable games and animations. Here are a few tips to protect yourself from the deluge:**

- Filter for certain files including .exe, .vbs, .wav, as well as certain domains.
- Filter for subject lines that include such phrases as "A greeting from . . ."
- Limit the size of mailboxes so users can't store holiday greetings.
- Limit the size of inbound and outbound attachments.
- Reiterate or institute policies aimed at restricting use of e-mail for holiday greetings.

---

# Computer Associates boosts management software

■ **BY DENISE DUBIE**

ISLANDIA, N.Y. — Computer Associates this week will unveil a slew of software upgrades, including a new release of its Neugents software that beta users say adds more intelligence and automation in some decision-making applications.

The releases fall under CA's newly named CleverPath division, which includes products formerly known as Jasmine or Neugents.

Neugents can search through data sources to find patterns of activity and predict outcomes. CA renamed Neugents ii as CleverPath Predictive Analysis Server 2.0.

It can now better detect fraud in insurance applications at Cruz Blanca, a healthcare provider in Chile. Flavio Henriquez, IT engineer at Cruz Blanca, has used Neugents since January in an application that helps auditors spot fraudulent cases, and the insurance company has been testing the new release for about a month.

"Version 1 doesn't tell you what kind of fraud was committed, just that it's likely there's fraud. The new version gives you hints at what the fraud is," he says.

The software acts as a filter, directing fraudulent applications to investigators and sending valid documents through the payment process. Cruz Blanca reports that the Neugents reports 40 suspicious cases every day and has been about 60% accurate, saving the company approximately $500,000.

CA upgraded several portal and business intelligence products under the company's new CleverPath brand. In July, the company announced four distinct brands

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## XLON

continued from page 1

shaker in the caching community. However, his track record to date is mixed, having co-founded now-defunct caching services company Edgix in 1999 and currently serving as CTO for Volera, a Novell spinoff that has had its ups and downs alongside other players in that market.

XLON CTO Greg Smith says Major's newest company will attempt to address shortcomings of existing network architectures.

"As we look at the horizon and we see what's coming, we see things like ever-increasing software sizes that are being downloaded . . . We see movies and television programs coming online," Smith says. Major saw network architectures that aptly handled existing Web demands, "but weren't necessarily geared toward large objects," he adds.

The market for content-delivery services is enticing and daunting. A recent report by market research firm IDC showed the market will spike in the next few years from $1.6 billion in 2001 to $8 billion in 2005. But finding a business model that works is tricky. Several companies, such as Edgix and Adero, attacking the market have closed their doors recently. Even some of the bigger players, including Akamai Technologies, have struggled, laying off staff and posting millions of dollars in losses.

Part of the reason for the tough playing field, analysts say, is the capital-intensive nature of the business. Akamai spent millions of dollars deploying more than 13,000 edge servers in hundreds of networks around the globe.

XLON executives are well aware of the situation, having seen Edgix — a company where some of them worked — burn through $65 million in funding before closing in April. But these officials say XLON will succeed because instead of building out a network, it mainly plans to exploit network resources that are in place.

That may give it an edge over other content-delivery service providers because it will be able to keep costs low, says Peter Christy, research director at Jupiter Media Metrix. XLON won't reveal pricing, but says customers using its service will pay five to 15 times less for Web content delivery bandwidth.

Major, along with fellow NetWare developer Dale Neibaur and friend Timothy Johansson, founded XLON about 14 months ago, but it has yet to officially launch. A pilot customer is scheduled in about two weeks to begin using the service to deliver software packages, Smith says

Other content-delivery newcomers, such as Evernet (www.nwfusion.com, DocFinder: 7049) and Kontiki (www.nwfusion.com, DocFinder: 7050), have launched similar services. But XLON executives say those firms are focused more on a peer-to-peer design. For XLON, peer-to-peer is just a small part of the approach, Smith says.

"We're looking at exactly how you get something really massive across the network, and the conclusion was you have to be able to source it from many different levels," he says.

Get more information online.
DocFinder: 7053
www.nwfusion.com

Dale Olds, who created Novell Directory Services, is the chief architect of XLON's software, which is built on a directory model similar to NDS. NDS is a repository that keeps track of network resources.

"What we really come down to is a distributed computing platform that is a directory service," Smith says. "Instead of being a personal information directory service, it's a network and content-directory service."

Customers could use XLON's service by installing what the start-up calls an "Integrator" next to their primary content server. The Integrator, a Volera proxy cache or a homegrown XLON cache, intercepts requests made to a content provider's Web site and forwards them to XLON's network. No code changes need to be made to the content provider's Web site, and the provider retains control of its content.

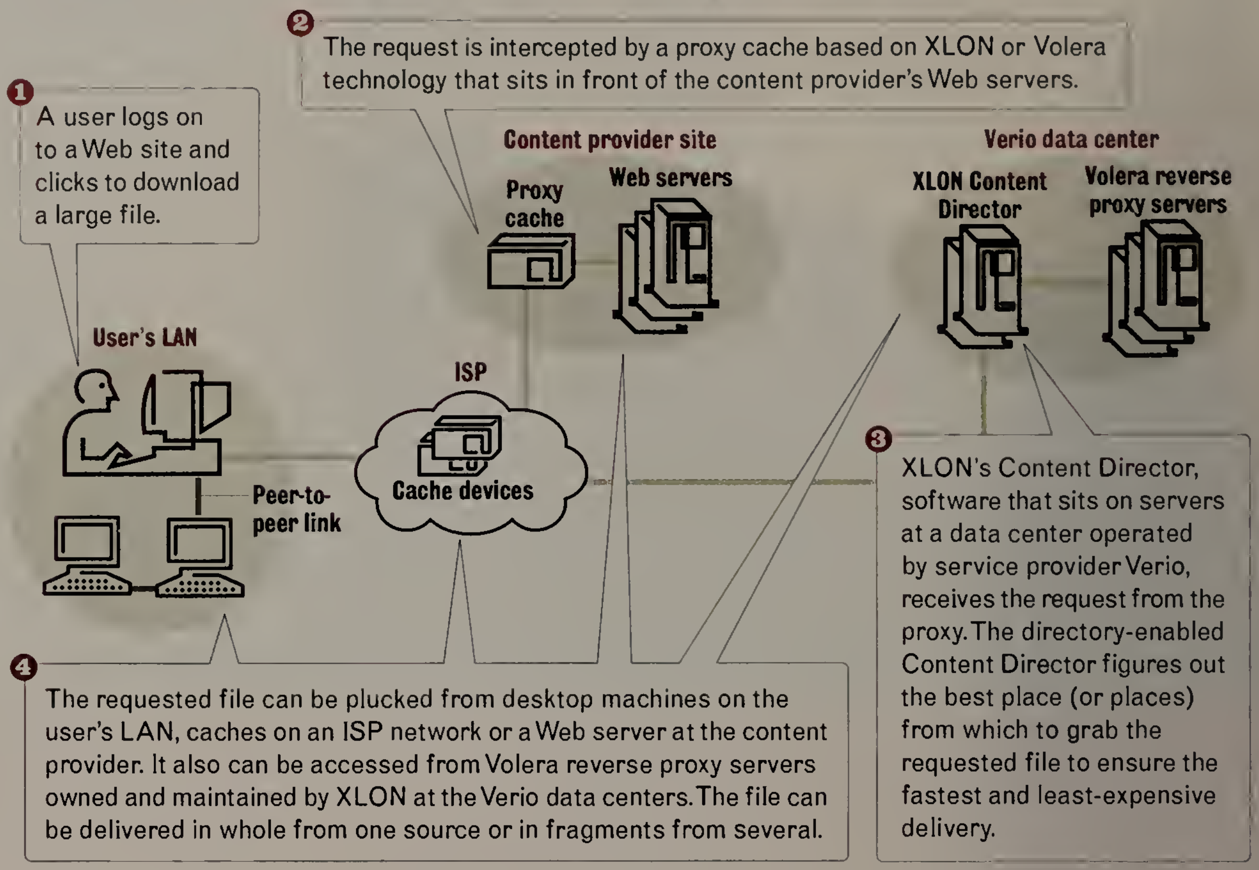
XLON's Content Director, software that would reside on servers in data centers hosted by Verio, could use its directory technology to determine how to best get the requested content to the requesting party.

"We're not looking to build out a 13,000-server network the way Akamai has," Smith says. "We're looking to go to Tier 2 ISPs and . . . help them leverage their existing infrastructure."

XLON: www.XLONtech.com

## Living large

**XLON exploits off-the-shelf products and proprietary technology as well as partners' networks and data centers to speed delivery of large objects across the 'Net.**



❷ The request is intercepted by a proxy cache based on XLON or Volera technology that sits in front of the content provider's Web servers.

❶ A user logs on to a Web site and clicks to download a large file.

❸ XLON's Content Director, software that sits on servers at a data center operated by service provider Verio, receives the request from the proxy. The directory-enabled Content Director figures out the best place (or places) from which to grab the requested file to ensure the fastest and least-expensive delivery.

❹ The requested file can be plucked from desktop machines on the user's LAN, caches on an ISP network or a Web server at the content provider. It also can be accessed from Volera reverse proxy servers owned and maintained by XLON at the Verio data centers. The file can be delivered in whole from one source or in fragments from several.

# Aprisma customizes Spectrum

■ BY DENISE DUBIE

DURHAM, N.H. — Although its Spectrum software supports 850 network devices and applications out of the box, Aprisma's upcoming releases also give users new ways to customize the software to better manage problems specific to their networks.

Aprisma recently announced it would make two new versions of Spectrum generally available in January 2002 (see www.nwfusion.com, DocFinder: 7034): Spectrum Integrity for corporations and Spectrum Infinity for service providers. A third release for smaller companies also is slated for early next year, completing the company's first major upgrade of the product since May 1999.

"Spectrum has always done a good job of including all the information on a lot of devices that are managed, but it can't keep up 100%. No one could," says Michael Wiseman, a network support engineer for the University of Toronto. "But this version is very customizable. I was able to enter some information on Foundry [Networks] devices Spectrum didn't include. Now I can go in and collect the data from devices once and customize Spectrum to use that information."

Spectrum network management software provides a map of SNMP-manageable devices, such as routers, hubs and switches. Users install software agents throughout their networks that send data to a central Spectrum management console.

Paul Bugala, a senior analyst at market research firm IDC, says Aprisma may have delivered on what customers want, but he thinks the company should educate users on all the functionality in Spectrum.

"If Spectrum is used appropriately, it can eradicate a lot of reactive management in enterprise networks. If a user takes the time upfront to learn the product and customize it, [Spectrum] can lower the resources needed to manage a network," Bugala says.

Spectrum Integrity includes a new event correlation system. Previously, Spectrum correlated events using a model: Now it will also perform rules-based event correlation. Rules-based correlation lets users write their own rules to make sense of network events.

Also new for the large enterprise customer is alarm-impact analysis. This feature, the company says, lets users prioritize alarms based on the importance of the managed device. The software gives users a list of what devices are not working and what services, applications and users are directly affected.

Spectrum Infinity for service providers adds gateways to let users pull data from service provider systems in Spectrum. The software uses the gateway to receive alarms from non-SNMP devices used in service provider networks.

Spectrum Integrity starts at $75,000, with volume discounts available. Spectrum Infinity starts at $125,000, also with volume discounts available.

Aprisma: www.aprisma.com

■ THIS WEEK'S QUESTION:

The Wireless Ethernet Compatibility Alliance refers to 802.11b LANs as Wi-Fi. What's the nickname for 802.11a LANs?

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BI101

## 1. What is the principal business activity at your location?

(check ONE only)

01.☐ Manufacturing (Non-Computer/ Communications OEM)
02.☐ Finance/Banking
03.☐ Insurance/Real Estate/Legal
04.☐ Health Care Services
05.☐ Hospitality/Entertainment/ Recreation
06.☐ Media/TV/Cable/Radio/Print
07.☐ Retail/Wholesale Trade/Business Services
08.☐ Transportation
09.☐ Utilities/Process Industries (Mining/Construction/ Petroleum Refining/ Agriculture/Forestry)
10.☐ Government/Military
11.☐ Consulting (Independent) *
12.☐ Education
13.☐ Carriers/Voice/Data/ISP
14.☐ Web Hosting/HSP
15.☐ ASP/SSP/MSP
16.☐ Manufacturing (Computer/ Communications/OEM)
17.☐ Resellers/VARs/VADs/ Integrators/Distributors* (Computers/Communications)
18.☐ Other (please specify) ____

*Attn Consultants, Integrators, Distributors, Resellers: Please complete form based on ALL clients and your own business needs

## 2. P: What is your primary job function? (check ONE only) S: What additional job functions are you involved in? (check ALL that apply)

P S
☐ 1. ☐ Network Management
☐ 2. ☐ CIO/CTO/IS/IT/MIS/ Systems Management
☐ 3. ☐ LAN Management
☐ 4. ☐ Datacom/Telecom Management
☐ 5. ☐ Internet/Intranet/Web/ E-Commerce Management
☐ 6. ☐ Engineering Management
☐ 7. ☐ Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.)
☐ 8. ☐ Consultant (Independent)
☐ 9. ☐ Other (please specify) ____

## 3. What is the estimated value of network equipment and services that you specify, recommend, or approve the purchase of?

(Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–O.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 Million to $24.9 Million
5. $1 Million to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ____ Large Systems *(Mainframes/Minis)*
B ____ Desktops *(Micros/Laptops/ Workstations)*
C ____ Mobile *(including PDAs, Wireless)*
D ____ Servers
E ____ LANs
F ____ WAN Equipment
G ____ Carrier Services
H ____ Internet/Web/E-commerce
I ____ Intranet/Extranet
J ____ Internetworking *(including Routers, Switches)*
K ____ Storage
L ____ Remote Access
M ____ Peripherals
N ____ Software
O ____ Service/Support Services

## 4. What is the total number of sites for which you have purchase influence?

(check ONE only)

1. ☐ 100+ 2. ☐ 50 to 99 3. ☐ 20 to 49 4. ☐ 10 to 19 5. ☐ 2 to 9 6. ☐ 1 7. ☐ None

## 8. Please indicate the Web/Security/LAN/Internetworking/Wireless/Mobile/WAN Equipment/ Carrier Services that you are currently involved in purchasing or plan to purchase:

(check ALL that apply) A. Currently involved in purchasing B. Plan to purchase

WEB
A B
☐ 01. ☐ Web Servers/Software
☐ 02. ☐ Web Traffic Management
☐ 03. ☐ Electronic Commerce Tools
☐ 04. ☐ Web Development Tools
☐ 05. ☐ Web Content Management
☐ 06. ☐ Web Collaboration/ Groupware
☐ 07. ☐ Web Acceleration/Caching/ Load Balancing
☐ 08. ☐ Web Hosting Services
☐ 09. ☐ Other

SECURITY
A B
☐ 10. ☐ Firewalls
☐ 11. ☐ Anti-Virus Software
☐ 12. ☐ Private Key Encryption Tools
☐ 13. ☐ DES Encryption Tools
☐ 14. ☐ Authentication Tools
☐ 15. ☐ Intrusion Detection
☐ 16. ☐ Certificate Authorities
☐ 17. ☐ Biometrics
☐ 18. ☐ Other

LANs/INTERNETWORKING
A B
☐ 19. ☐ Fast Ethernet
☐ 20. ☐ Gigabit Ethernet
☐ 21. ☐ Layer 3-7 Switches
☐ 22. ☐ ATM Switches
☐ 23. ☐ Routers
☐ 24. ☐ Network Attached Storage (NAS)
☐ 25. ☐ Storage Area Networks (SANs)
☐ 26. ☐ Storage Backup (Optical, Disk, Tape, RAID)
☐ 27. ☐ Network Test/Diagnostic Tools
☐ 28. ☐ Uninterruptable Power Supplies (UPS)
☐ 29. ☐ Network Interface Cards (NICs, PCMCIA)
☐ 30. ☐ Hubs/Intelligent Hubs/ Stackable Hubs
☐ 31. ☐ Cables,Connectors, Baluns
☐ 32. ☐ Wiring/Fiber Systems
☐ 33. ☐ Net Management Systems
☐ 34. ☐ Voice Over IP (VoIP) Tools
☐ 35. ☐ Network Analyzers
☐ 36. ☐ Other Local-Area Network/ Internetworking

WIRELESS/MOBILE
A B
☐ 37. ☐ Wireless LANS
☐ 38. ☐ Wireless/Cell Phones
☐ 39. ☐ Wireless LAN Extension Tools
☐ 40. ☐ Mobile Data Equipment/Services
☐ 41. ☐ PDAs
☐ 42. ☐ Other Remote/Wireless

WAN EQUIPMENT
A B
☐ 43. ☐ Frame Relay Equipment
☐ 44. ☐ Bandwidth Managers
☐ 45. ☐ Bandwidth Shaping/QOS Tools
☐ 46. ☐ VPN Equipment
☐ 47. ☐ ATM Switches
☐ 48. ☐ Voice/Video over IP Gateways
☐ 49. ☐ Modems
☐ 50. ☐ Cable Modems
☐ 51. ☐ xDSL Products
☐ 52. ☐ Diagnostic/Test Equipment
☐ 53. ☐ DSUs/CSUs
☐ 54. ☐ PBXs
☐ 55. ☐ Call Center Tools
☐ 56. ☐ Videoconferencing Gear
☐ 57. ☐ ISDN Equipment/Services
☐ 58. ☐ Other WAN Equipment/Services

CARRIER SERVICES
A B
☐ 59. ☐ Internet Access
☐ 60. ☐ Private Lines
☐ 61. ☐ Frame Relay Services
☐ 62. ☐ ADSL/DSL
☐ 63. ☐ T-1/T-3 Services
☐ 64. ☐ ATM Services
☐ 65. ☐ Managed Services
☐ 66. ☐ VPN Services
☐ 67. ☐ LAN-Extension Services
☐ 68. ☐ OC-3/OC-12
☐ 69. ☐ Wavelength Services
☐ 70. ☐ Dark Fiber
☐ 71. ☐ Other Carrier Services
None of the above (1 – 71) A ☐ 72. ☐ B

## 9. Please indicate the Systems/Peripherals/Software/Applications/Business Services that you are currently involved in purchasing or plan to purchase:

(check ALL that apply) A. Currently involved in purchasing B. Plan to purchase

SYSTEMS/PERIPHERALS
A B
☐ 01. ☐ Laptops/Notebooks
☐ 02. ☐ Desktops
☐ 03. ☐ Intel-Based Servers
☐ 04. ☐ Risc-Based Servers
☐ 05. ☐ Print Servers
☐ 06. ☐ Fax Servers
☐ 07. ☐ Remote Access Servers
☐ 08. ☐ Video Servers
☐ 09. ☐ Mid-Range Systems (including workstations)
☐ 10. ☐ Mainframes
☐ 11. ☐ Printers
☐ 12. ☐ Enclosures/Racks/Furniture
☐ 13. ☐ Other Computers/ Peripherals

SOFTWARE/APPLICATIONS
A B
☐ 14. ☐ Desktop/Server Operating Systems
☐ 15. ☐ Network Management
☐ 16. ☐ Systems Management
☐ 17. ☐ Directory Services
☐ 18. ☐ E-Mail
☐ 19. ☐ Groupware
☐ 20. ☐ Database Management Systems
☐ 21. ☐ Customer Resource Management (CRM)
☐ 22. ☐ Enterprise Resource Planning (ERP)
☐ 23. ☐ XML Tools
☐ 24. ☐ Desktop Videoconferencing
☐ 25. ☐ Middleware
☐ 26. ☐ Document Management Tools
☐ 27. ☐ Site Metering Tools
☐ 28. ☐ Software Distribution Tools
☐ 29. ☐ Data Warehousing
☐ 30. ☐ Applications Development Tools
☐ 31. ☐ Other Software/Applications

BUSINESS SERVICES
A B
☐ 32. ☐ Application Service Provider Services
☐ 33. ☐ Systems Integration/ Consulting
☐ 34. ☐ Education/Training Services
☐ 35. ☐ Other Services
None of the above (1 – 35) A ☐ 36. ☐ B

## 10. Please indicate the platforms that are currently installed/planned:

(check ALL that apply) A. Currently installed B. Planned for purchase

NETWORK PROTOCOLS
A B
☐ 01. ☐ TCP/IP v4
☐ 02. ☐ TCP/IP v6
☐ 03. ☐ SNA/APPC/APPN/LU6.2
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ NETBIOS/NETBUEI
☐ 06. ☐ NFS
☐ 07. ☐ Other Network Protocols

LAN/WAN ENVIRONMENT
A B
☐ 08. ☐ Gigabit Ethernet
☐ 09. ☐ Switched Ethernet
☐ 10. ☐ Fast Ethernet
☐ 11. ☐ Ethernet
☐ 12. ☐ ATM
☐ 13. ☐ Token Ring/Token Ring Switching
☐ 14. ☐ Layer 3-7 Switching
☐ 15. ☐ FDDI
☐ 16. ☐ Fibre Channel
☐ 17. ☐ Wireless LANs
☐ 18. ☐ DSL
☐ 19. ☐ ISDN
☐ 20. ☐ Frame Relay
☐ 21. ☐ Private Line T1, T3, OC-3, OC-12
☐ 22. ☐ Other LAN/WAN Environment

DESKTOP/SERVER OPERATING SYSTEMS
A B
☐ 23. ☐ Windows 2000
☐ 24. ☐ Windows 95/98
☐ 25. ☐ Windows NT/Windows 2000
☐ 26. ☐ Novell (NetWare 5.X, 4.X, 3.X, 2.X)
☐ 27. ☐ LINUX
☐ 28. ☐ Intel based UNIX
☐ 29. ☐ RISC based UNIX (incl. SOLARIS)
☐ 30. ☐ IBM MVS/VM/VSE/ESA
☐ 31. ☐ OS/400
☐ 32. ☐ Digital VMS
☐ 33. ☐ Macintosh
☐ 34. ☐ Palm OS
☐ 35. ☐ Windows CE
☐ 36. ☐ Other Network Operating System
None of the above (1– 36) A ☐ 37. ☐ B

*Continued on next page...*

*Continued from page one...*

**5.** What is the total number of Servers/Clients installed/planned at your location/in your entire organization? (check ONE box in each column)

| SERVERS At Location A | | SERVERS Entire Org. B | CLIENTS At Location C | | CLIENTS Entire Org. D |
|---|---|---|---|---|---|
| ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ |
| ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ |
| ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ |
| ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ |
| ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ |
| ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ |
| ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ |
| ☐ | 8. none | ☐ | ☐ | 8. none | ☐ |

**6.** What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

**A. Scope** (check ONE only)

CORPORATE/ENTERPRISE:
1.☐ Entire Enterprise/ Multiple Enterprises
2.☐ Multinational Enterprise
3.☐ Division/Multiple Divisions
4.☐ Department
5.☐ None

**B. Involvement** (check ALL that apply)

1.☐ Create Network/IT Strategy
2.☐ Recommend/Specify Brand
3.☐ Approve Purchase
4.☐ Evaluate Products/Services
5.☐ Determine the Need
6.☐ None

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**7.** What is the estimated number of employees in your entire organization/at your location? (check ONE in each section)

**A. Entire organization:**

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

**B. At your location:**

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 100 – 249
9. ☐ 99 or less

**11.** Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

**A - Servers**

1. ☐ IBM (Mainframes)
2. ☐ IBM RS/6000
3. ☐ IBM AS/400
4. ☐ Compaq/Digital/ Tandem
5. ☐ Unisys
6. ☐ H-P
7. ☐ Other

**B - Workstations/Desktops/Laptops**

1. ☐ Sun Microsystems
2. ☐ H-P
3. ☐ Compaq/Digital
4. ☐ IBM
5. ☐ Dell
6. ☐ Gateway
7. ☐ Fujitsu
8. ☐ Other

**12.** What is the estimated gross revenue of your entire company/institution? (check ONE only)

1. ☐ $20 Billion or More
2. ☐ $10 Billion to $19.9 Billion
3. ☐ $1 Billion to $9.9 Billion
4. ☐ $500 Million to $999.9 Million
5. ☐ $100 Million to $499.9 Million
6. ☐ $50 Million to $99.9 Million
7. ☐ $10 Million to $49.9 Million
8. ☐ $5 Million to $9.9 Million
9. ☐ $4.9 Million or Less
10. ☐ None of the above

**13.** For which areas outside of the U.S.A. do you have purchase influence? (check ALL that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ Africa
7. ☐ Canada
8. ☐ None

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# Infrastructure

- TCP/IP, LAN/WAN SWITCHES
- ROUTERS ■ HUBS
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- SERVERS ■ OPERATING SYSTEMS
- VPNS ■ NETWORKED STORAGE

## Short Takes

■ **IBM** recently unveiled servers that will let Windows and Linux shops exploit the kinds of fault-tolerance and scalability features more commonly found in mainframes and high-end Unix machines. IBM's **eServer xSeries machines,** previously known as "Summit," are designed to give customers a new way to centralize their computing systems and support more demanding applications. The first xSeries machine will ship in a 3U (5.25-inch-high) configuration and come powered by up to 16 Intel Foster processors, the next iteration of Intel's 32-bit architecture. That's twice as many processors as in comparable servers. Later versions of the xSeries machines will run on Intel's upcoming 64-bit McKinley processors. The servers support Windows NT, 2000 and DataCenter and Linux, and can be partitioned by processor to increase performance. Support for Active PCI-X lets IT managers replace PCI or PCI-X adapters without shutting servers down. Pricing and availability have not been set. www.ibm.com

■ **Qlogic** recently revealed a storage-area network kit that lets network managers build SANs for small or midsize businesses. The "SAN in a Can" contains a Fibre Channel switch, four host bus adapters, SAN management software, preterminated cables and fiber-optic connectors. The **SAN Connectivity Kit 1000** is available now for $10,000. www.qlogic.com

■ **Dell** last week introduced its **PowerEdge 1500SC**, a dual-processor midrange server with a base price of $1,400. The server contains ServerWorks' HE-SL chip set, which supports an Intel 1.13-GHz Pentium III processor, and an Intel PRO/1000 XT Gigabit Ethernet network connection on the motherboard. Standard features include error checking and correcting memory, hot-plug hard drives and a hardware monitor that automatically reboots the system in case of a failure in the operating system. www.dell.com

# Users wary of Nortel's woes

## Vendor's recent moves prompt customers to reevaluate relationships.

■ **BY PHIL HOCHMUTH**

Nortel's recent market woes and corporate reorganizing have caused some long-time Nortel/Bay Networks customers to jump ship, while others loyal to Nortel say they will put the vendor under close scrutiny.

It's been a bad year for Nortel, which has cut 50,000 workers and watched its stock price shrink more than 90% since January. And when Nortel last month announced a record third-quarter loss of $3.6 billion, the company also outlined a technology restructuring plan that made some Nortel enterprise customers nervous.

Among the three technologies Nortel says it will focus on — long-haul optical, metropolitan-area networks (MAN) and wireless — enterprise network gear was conspicuously absent from vendor's vision.

That absence didn't go unnoticed by Nortel's enterprise customers, and users have differing opinions on how closely they will ally themselves with the company going forward.

With more than $50 million invested in Nortel gear over the past few years, Sheng Guo, CTO for the State of New York Court System, doesn't like to hear bad news about his main vendor.

**While Sheng Guo, CTO for the State of New York Court System, will continue using Nortel products, but will keep a close eye on support quality.**

New York's state courts have used Nortel and Bay equipment for almost seven years (Nortel acquired Bay in 1998). Recently, the court system installed an OC-3 network of Nortel Passport 8600 switches with packet-over-SONET modules to link offices and courthouses in upstate New York for high-speed data transfers and wide-area videoconferencing. The court system is also in the middle of rolling out optical dense wave division multiplexing technology in the Manhattan area to connect court buildings in the city on a multi-Gigabit Ethernet ring.

"While their recent financial trouble is a cause of concern to us, it is important that [Nortel] continue to provide the technology we need. It is even more important that they provide the highest level of support when we run into problems," Guo says.

So far, Nortel has done a good job of keeping Guo and his staff updated on its strategy and product offerings. Guo adds that he was impressed recently with Nortel's support during the World Trade Center attacks, when the vendor sent a "SWAT team" of engineers to help the court system set up an emergency voice-over-IP network to circumvent downed telephone lines as a result of the attacks.

### Scrutinization

Despite his good feelings about Nortel, Guo realizes that a company that ends the year with half the employees it had at the beginning needs to be scrutinized.

"We will continue to use Nortel products while closely monitoring the company's performance," he says.

At the University of California at Berkeley, the change from Nortel to other switch vendors' wares began before the pink slips started flying and red ink was dripping at

See Nortel, page 16

# NetBotz surveys physical environment

## Appliance and software family monitors servers and network facilities.

■ **BY DENI CONNOR**

AUSTIN, TEXAS — With an eye toward helping network managers monitor intrusions and protect equipment investments, NetBotz rolled out several new hardware appliances and software that can be used to monitor and manage the environmental conditions of network gear, servers and equipment rooms.

Normally, server room equipment is environmentally monitored by software residing individually on a server, switch or other network gear, rather than from a consolidated interface. Separately mounted surveillance gear detects equipment room intrusions. With NetBotz's equipment, these functions have been incorporated into single rack- or wall-mounted devices.

With that in mind, the company last week introduced NetBotz Surveillance, Branch Checker, WallBotz 400 and RackBotz 400.

NetBotz Surveillance lets network managers monitor and take pictures of intruders to the physical environments surrounding local or remote network equipment and servers. The software is used with NetBotz Central, a software application that lets users view, store and report motion in server rooms and camera data collected by NetBotz appliances physically located with the network equipment.

The Surveillance package stores photos and generates alarms when it detects motion or when the duration of the motion exceeds a preset level. They also report information to network and system man-

See NetBotz, page 16

### Security monitoring

**The NetBotz Surveliance device lets users monitor server room humidity and temperature.**

- 1U (1.75-inch) high.
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**TOLLY ON TECHNOLOGY**
Kevin Tolly

# A few words on campus wireless

There's no dearth of columnist verbiage on wireless these days, although the lion's share of that seems to center around security-related issues. While security concerns are not unimportant, they're hardly the only issues that enterprise architects need to consider. In this column, we'll consider others.

Before we do, though, a point of techno-etiquette. When in the presence of a representative of the Wireless Ethernet Compatibility Alliance (www.wi-fi.org), do NOT make the mistake I always make and refer to this technology as 802.11b. Should you commit this faux pas, you will be sternly reminded that the technology should be called "WiFi." (This is not a joke.) To further support this, you'll be reminded that we speak of "Ethernet," not 802.3.

Everyone can relate to the benefits of untethered, networked computing. For net managers, it means the ability to instantly bring new users online without running cable or dealing with switch port counts. For users, it means being able to virtually bring their entire work environment with them to a conference room, another floor or another building on campus. But is it really the panacea that it seems?

Well, like all technologies, wireless brings with it a series of trade-offs. Let's get the worst trade-off out of the way first.

Unlike its wired cousin, the LAN switch, the wireless access point offers a shared network. Think of it as a wireless hub. Thus, rather than 100M bit/sec dedicated to each client, we have, with, ahem, WiFi a maximum of 11M bit/sec shared among users.

The access mechanism, like shared Ethernet, is based on a collision scheme. Thus, congestion situations can develop quickly if multiple users are attempting to stream data. Work is under way to impose a more controlled access mechanism.

With wired infrastructures, your Fast Ethernet link runs at 100M bit/sec or doesn't run at all. That's not the case with wireless. As the distance between client and access point increases, the signal weakens — the wireless client-access point duo automatically ratchets down the transmission speed. This is sort of a real-time reversal of modem speed negotiation. So your 11M bit/sec link quickly may negotiate its way down to 5.5M, 2M or 1M bit/sec as conditions deteriorate.

Wireless is now getting a big bandwidth bump with the introduction of 54M-bit/sec technology based on the IEEE 802.11a standard.

However, where Ethernet network interface cards (NIC) and switches are always dual-speed 10/100, that's not the case with wireless. The 802.11a technology uses a different radio than its 802.11b cousin. It operates in the 5-GHz range as opposed to 802.11b's 2.4-GHz range.

A dual-speed wireless NIC would need two radios — not something you're likely to see. So architects managing mixed networks will have to plan to install access points with two radios. Some already support this, others don't.

Such issues are bound to surface again in the next few weeks as leading vendors such as Cisco, Foundry Networks and Extreme Networks jump-start a six-city State of the LAN/MAN tour (see www.nwfusion.com, DocFinder: 7027).

*Tolly is president of The Tolly Group, a strategic consulting and independent testing company in Manasquan, N.J. He can be reached at ktolly@tolly.com or www.tolly.com.*

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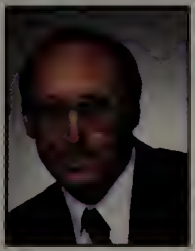

Dennis Drogseth is a director at Enterprise Management Associates, a leading analyst and market research firm focused on management software and services. Drogseth focuses on aspects of enterprise and service provider management requirements. Currently, he is researching managing the network as a delivery system for services, and changing IT roles. His 18 years of experience in high-tech includes positions at IBM and Cabletron.

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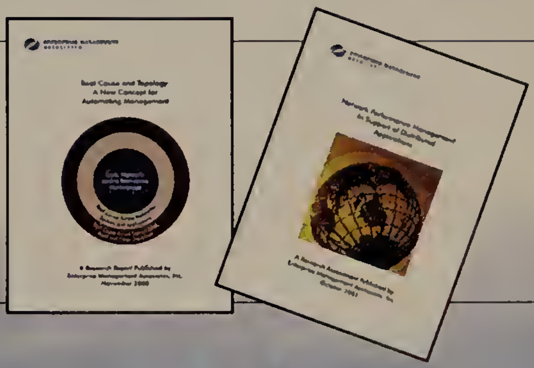

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# Vendors lower Gigabit Ethernet price bar

■ BY PHIL HOCHMUTH

Netgear and D-Link Systems recently debuted an array of copper-based Gigabit Ethernet products, some with a per-port price tag as low as $90.

The new 1000Base-T switches and network interface card (NIC) could be used by businesses looking to boost their LAN bandwidth, but which can't afford to buy expensive fiber-optic cabling and hardware to support Gigabit Ethernet. Larger companies could use the products to expand their copper Gigabit connections inexpensively.

With copper-based Gigabit Ethernet products shipping for more than a year now, the significance of these new products is not so much what they do, but what they cost. At $90, Netgear's new NIC is the lowest-cost product of its kind, while Netgear's switches cost between $91 and $97 per Gigabit port. D-Link's switch is in the same price range, at around $100 per port.

Netgear's GS516T and the GS524T switches provide 16 and 24 unmanaged Layer 2 Gigabit Ethernet ports that work with Category 5 wiring. All ports on the switches can autosense 10/100/-1000M bit/sec connections. The Netgear's FS309T and FS509T switches provide eight 10/100 links, with a single 1000Base-T uplink port.

D-Link's 1000Base-T switch, the DGS1008-T, comes with eight Layer 2, unmanaged copper Gigabit ports which can also autosense 10M-bit/sec and Fast Ethernet links.

Netgear's 16- and 24-port switches and D-Link's eight-port box could be used to connect servers in a small data center, while Netgear's two 10/100 switches are designed to connect workgroups and uplink to a backbone over Gigabit Ethernet.

**Cheap speed**

**While the average Gigabit Ethernet port cost $544 in Q3 of this year, some vendors offer 1000Base-T products for as low as**

**$90**

**per port.**

SOURCE: DELL'ORO GROUP

Netgear also announced the GA302T, a 32-bit, copper Gigabit Ethernet NIC that is targeted for desktop users who require 1000M bit/sec network connections, such as database file analysts, graphic artists or computer-assisted design engineers.

While running Gigabit Ethernet over Cat 5 wire has its limitations — such as a 328-foot maximum cable reach and incompatibility with older copper cabling types — companies are starting to use the technology for running Gigabit connections to desktops, connecting workgroup switches to a local server or for server connections in a data center.

Low-cost copper Gigabit server adapters (some costing less than $150), now available from companies such as 3Com, Asanté, Intel and Netgear, have helped 1000Base-T server connectivity catch on.

With the average Gigabit Ethernet switch port costing about $544, according to third-quarter 2001 numbers from the Dell'Oro Group, companies can see big savings by going with 1000Base-T to add Gigabit Ethernet to segments of a network.

According to Dell'Oro, more customers are buying into 1000Base-T technology, as shipments of copper Gigabit Ethernet ports were up 10% in the third quarter of 2001.

The GS516T is priced at $1,590, while the GS524T costs $2,190. The FS309T and FS509T workgroup switches cost $200 and $290, respectively, while the GA302T NIC costs $90. D-Link's DGS1008-T costs $880. All products are available now.

Netgear: www.netgear.com; D-Link: www.dlink.com

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## Nortel

continued from page 11

Nortel this year.

"Nortel's problems are little bit of a concern to me," says Fred Archibald, a network manager at the university's computer science department. "I have a whole pile of Nortel stuff here."

Archibald's group has used Nortel equipment for several years, including Accelar and Passport switches at the core, and BayStack switches for workgroups — but that's changing, he says.

He has purchased switches from Extreme Networks in an effort to nudge out his Accelar and Passport switches in the core. In addition to what Archibald calls "performance issues" with Nortel switches, his biggest worry about the vendor is the effect Nortel's cutbacks may have on its customer support.

"Wherever they're cutting back, it can't be good," he says. "Some of their support hasn't been that great, and what they're doing now can't make it get any better."

While Archibald thinks Nortel can make a go of the product areas the company says it will focus on — long-haul optical, wireless and MANs — he doesn't foresee those kinds of technologies being rolled out in his department in the near future.

### Abandon ship?

Nortel has been one of the hardest hit during the enterprise market's recent struggles, the time hasn't come to abandon the company just yet, says Phil Kwan, associate director of network infrastructure at Incyte Genomics in Palo Alto. Still, Kwan is hedging his bets.

"Incite is and always has been a multi-vendor type of company," Kwan says. "We protect ourselves from things like this by having multiple vendors in our core infrastructure." Incite uses switches mostly from Nortel and Foundry Networks in its Gigabit Ethernet backbone.

"We use a lot of [Nortel's] larger chassis-based [boxes], and we do have plans to continue to use them," he says.

### Pieces and parts

While Kwan says Nortel equipment performs well, the company's troubles may affect how fast it can get products to customers.

"We have noticed in the last couple months that getting parts — such as blades for extra gigabit ports — has been a lot slower than we'd like it to be," he says.

As to whether he has doubts about Nortel's future in his network, "I'd say we're not too concerned," Kwan says. "We know Nortel is a fairly large company."

Kwan works closely with Nortel in terms of keeping up with what new products and equipment features the company has coming out.

He says Nortel is committed to growing its enterprise business and improving its products.

"If they were to drop all of those plans ... then I'd say we would probably be a little bit more concerned, and we'd probably look for a secondary provider other than Nortel if that was to happen," he says. ■

JASON GROW

**"We use a lot of [Nortel's] larger chassis-based [boxes], and we do have plans to continue to use them."**

**Phil Kwan**
Associate director of network infrastructure,
Incyte Genomics

www.nwfusion.com

**More online!**

Link to our Nortel forum and read what other Nortel users think about the vendor's troubles.

**DocFinder: 7033**

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## NetBotz

continued from page 11

agement frameworks such as Computer Associates Unicenter TNG, Hewlett-Packard OpenView or Ipswitch WhatsUp Gold.

NetBotz Branch Checker software monitors the round-trip communication between headquarters and remote offices to determine domain name services, e-mail and Web services are operating correctly. It generates alarms to e-mail or systems management frameworks if any of these forms of communication are disrupted.

In addition to NetBotz Surveillance and Branch Checker, NetBotz is introducing WallBotz and RackBotz 400, new versions of its network monitoring appliances. These appliances sit in the rack enclosure or on the wall and monitor variations in the temperature and humidity, as well as airflow of servers and other network gear and generate alerts if thresholds are exceeded.

The hardware has motion-detection features and seven external sensor ports for attaching equipment and a digital port. If power or network connectivity is lost to a NetBotz 400 appliance, the digital port will dial out to a technician's pager.

The WallBotz and RackBotz run a software operating system called BotzWare. They compete with products such as sensorArray from Uptime Devices.

The WallBotz and RackBotz are available immediately for $1,500 each. NetBotz Surveillance costs $3,750 while NetBotz Branch Checker is priced at $200.

NetBotz: www.netbotz.com

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## Short Takes

■ **Covalent Technologies** earlier this month released a version of its Web server based on **Apache 2.0**, even though the official keepers of Apache claim Version 2.0 is still in beta testing. Covalent's **Enterprise Ready Server** product is based on the code for the next version of Apache, an open source Web server, with proprietary features for easier management and credit card processing. The new version of Enterprise Ready Server also includes management features that let a Web page administrator configure and update a large number of identical Web pages at once. While a release date for Apache has not yet been set, it will feature faster performance and improved Windows compatibility. The software is developed by Apache.org, a group of open source programmers, many of whom are employees at Covalent. Apache 2.0 was supposed to have debuted a year ago, but only entered the beta stage in April 2001. Apache competes with Microsoft's Internet Information Server, and Sun's iPlanet Web server. www.covalent.com

■ **XDegrees** last week introduced the **XDegrees System** for creating a secure network for exchanging information across a distributed enterprise environment or with enterprise partners. The system puts a Web overlay on file systems, letting users tag documents for sharing and assigning unique URLs to those documents. The URL provides access via a Web browser or the XDegrees client, a piece of software that allows peer-to-peer transfer of information. The system also can be used for information sharing between applications. XDegrees is integrated with Microsoft Outlook and Office, and .Net Alert, a notification service, and Passport, an authentication service. The XDegrees server runs on Windows NT, Sun Solaris and Linux. The client runs on the same platforms plus Macintosh. A deployment of 100 seats is priced at around $100,000.

# Taking control of Web chaos

■ BY ANN BEDNARZ

After years of building Web sites with little regard for standardization, users and industry experts agree it's time for companies to clean up their Web acts.

Just ask Emerson Electric, which after letting its 60 divisions develop their own Web sites with their own tools now has standardized on two Web development platforms. Or Barclays Global Investors, which scrapped its five regional sites for one central site.

Driving the case for consolidation is the desire to make more efficient use of IT resources. If companies limit the number of software programs they deploy, they can decrease IT support costs. Adopting a corporatewide system for Web content can lessen companies' dependence on time-consuming, manual Web publishing tools as well as reduce marketing inconsistencies across divisions.

From a customer standpoint, Web consolidation translates into convenience. Customers increasingly expect a company to offer access to all of its wares from a single site and with centralized transaction control — no one wants to conduct separate transactions to buy PCs, printers and peripherals from a single vendor, for example.

Without a corporatewide Web strategy, companies wind up with scattered bits of customer information stored in the various data repositories associated with each software platform and no easy way to exchange information internally or with channel partners. Enterprise resource planning (ERP) and customer relationship management (CRM) applications are designed to consolidate customer data, but that information needs to be available, not just to internal employees but also to channel partners and customers through Web sites.

To accomplish Web consolidation, companies today are choosing technology such as portals, content management and enterprise application integration (EAI) software, says Gene Phifer, vice president and research director at Gartner. "Companies are asking, 'how do I leverage what I have better? How do I take these ERP and CRM systems that I spent all this money on, and tie them together?,'" he says. "That's why you see portals. That's why you see EAI technology."

Companies first let their divisions explore a bunch of Web options, because no one knew what approach would be the most successful, says Christopher Gardner, a partner at PricewaterhouseCoopers in charge of the firm's IT strategy practice. Now they're moving on to the next stage, which is to rein in the chaos.

### The Emerson way

At Emerson Electric, the focus is on centralization.

Two years ago the $15.5 billion company

See Web strategies, page 20

## Streamlining online operations

**Users and analysts share their advice on building a better Web site.**

1. **Clean up content.** Determine how content will be built, who will review it, and how it will look and feel. Then look for the technology to support those processes, says Gartner analyst Gene Phifer.
2. **Practice on employees, not customers.** After deciding on standards and building its new infrastructure, Barclays Global Investors first launched its corporate intranet site, not its public Web sites.
3. **Seek help.** "If the expertise does not exist in-house, go out and get the right help," says BGI's Mike Kelley. His company worked with systems integrator Fort Point Partners throughout its Web implementations.
4. **Reward pioneers.** To encourage Web innovation, Charlie Peters, vice president at Emerson, gets personally involved when a new Web project is proposed. He gave seed money to fund a Web chat project at Emerson's Closet-Maid modular shelving division, for example. Now it's a model for other business units.
5. **Spend wisely.** Focus on Web technology that will accelerate your business, says Pricewaterhouse-Coopers' Christopher Gardner. If suppliers are crucial, direct your Web efforts at a trading exchange, for example. If customer service is a bottleneck, consider Web self-service applications. Require more from the IT dollars you spend, Gardner says.

# ConfigureSoft helps soothe patch headaches

■ BY JOHN FONTANA

WOODLAND PARK, COLO. — Patching Microsoft software often is a labor-intensive task, but one that is essential to ensure enterprise networks are protected against known security vulnerabilities. ConfigureSoft aims to alleviate the task of tracking patches, which have totaled 26 in the past six months, and ensure software is locked up tight.

This week, ConfigureSoft will release Security Update Manager (SUM), which lets network executives track Microsoft patches, and automate the discovery of network machines that need patches. The software also automates patch deployment.

"We are always having to check for hotfixes being a regulated government organization," says Tim Seymour, network administrator in The Office of the Surgeon General, U.S. Army. "We are drawn to the auditing features of SUM because we have to audit our compliance to the regulations we work under."

Seymour, who has yet to deploy SUM, says the software can eliminate "false positives," such as reports that an individual hotfix is not installed when it is, but as part of a "rollup" patch, a collection of hotfixes.

SUM, a module for ConfigureSoft's Enterprise Configuration Manager, works by comparing patches released by Microsoft with server and desktop configuration data collected by ECM. The ECM software can run an assessment on 2,000 machines in

See Patches, page 20

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'NET INSIDER

Scott Bradner

# Postponing the inevitable

Much to my surprise we are not yet paying taxes on what we buy over the Internet.

Two years ago when Congress passed a ban on new Internet-related taxes, I fully expected that by the time the ban expired (now) that the government would have figured out how to levy taxes on online purchases and services.

But, in a significant departure from its normal practice, Congress has not done so. Or, if Congress could not figure out a universal way to collect tax money, it would just let the old ban expire. That would let state and local governments go hog-wild figuring out how to do to the Internet what has been done to the phone services — tax it almost to the point of pain. But this month Congress passed another two-year extension of the ban (see www.nwfusion.com, DocFinder: 7035).

I am surprised at the lack of taxes because figuring out how to tax things is part of "Being a Congresscritter 101." I am also shocked because there has been so much pressure at the local level to enact Internet-related taxes. There are occasional lapses where Congress reduces taxes, but those lapses are few and of short duration. Maybe the government reduces taxes so that it can get an opportunity to feel good when raising them again.

I do not expect that the current ban will survive its two-year lifetime. I expect that Congress will come up with some way out of its inability to formulate a taxing mechanism before then, and new legislation will be approved to correct the problem.

The Internet tax issue is more than a bit facetious because it is somewhat illogical to have one, or actually two ways of doing business exempted from the normal tax-full society. There is something off-kilter if your requirement to pay sales taxes depends on the method of purchase. There is no difference in concept between buying a set of drills at the local hardware store or over the Internet. You are exchanging money for drills. Why should there be a difference in taxes?

Note that this is not just an Internet vs. brick-and-mortar store kind of thing. The same is true for mail-order catalogs. Local authorities have tried to get these companies to pay taxes on the sales to customers within the geographic scope of the local authority. A few years ago the Supreme Court said that the requirement was fine, but enforcing it was not, at least for companies without a substantial presence in the local geographic scope. Congress will have to deal with both cases to move forward.

But, facetiousness aside, I expect that Congress will figure out a way to keep the lifeblood of governments flowing even in the new world of the Internet as most congresscritters have gone on to graduate school in the ways of revenue raising.

Disclaimer: Parts of Harvard may have helped in the advanced degrees, but I did not ask them their opinion on this issue.

*Bradner is a consultant with Harvard University University's Information Systems. He can be reached at sob@sobco.com*

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## Web strategies

continued from page 19

chose two Web development platforms on which to standardize: Click Commerce for its most complex Web sites and IBM WebSphere for all other sites. Today, 40 of its 53 Web sites operate on one of those two platforms. Thirteen sites still use other software but will shift to Click Commerce or WebSphere as they outgrow their current environments, says Charlie Peters, senior executive vice president at Emerson.

As part of its Web overhaul, Emerson also opted to outsource hosting of its Web sites. By first restricting the number of Web software platforms, Emerson could negotiate large-scale hosting contracts based on bundles of sites, rather than site-by-site terms. This approach also allows the company to consolidate its Web security efforts, Peters says.

**"With the old Web sites, we didn't look like a global organization, we just looked like a federation of loosely coupled local groups."**

**Mike Kelley**
Manager of Internet technology, BGI

"We can build our firewall strategy around these 40 hosted sites and be very effective," Peters says. But for the other 13 sites that are running on nonstandard software, the company has to procure hosting and develop security strategies for each one. He estimates the company saves roughly $5 million per year by centralizing the hosting of its sites, rather than hosting each site independently.

In conjunction with its infrastructure consolidation, Emerson is working to streamline its image, so customers see some consistency across divisions. One way it's doing this is through portals.

Currently, there are three significant portal projects underway at Emerson. One of them will pool content from 10 of Emerson's process-management divisions, which often sell to the same customers. The application work required to integrate the different divisions is considerable, Peters says.

Going forward, the work being done for the process-management portal will yield a corporate standard for EAI software.

### A common Web ground

At Barclays Global Investors (BGI), the focus is on unity.

BGI operates in five geographic regions, and the investment services it offers differ in each region. Two years ago BGI took a look at its corporate Internet strategy and realized it didn't have a cohesive one.

Each region had its own Web site, dedicated IT resources for creating HTML pages — plus various tools for generating the Web pages — and different methods for disseminating information to clients. Navigation features were dissimilar, and functions varied from site to site.

"With the old Web sites, we didn't look like a global organization, we just looked like a federation of loosely coupled local groups," says Mike Kelley, manager of Internet technology at BGI.

With the launch in April of the new Barclaysglobal.com, the company has a single site that serves all five regions. Personalization tools filter content based on users' locations as well as their relationship with Barclays.

"We were able to build that one infrastructure, and using personalization and other tools that we had available, create a single Web presence that satisfies multiple locations," Kelley says.

BGI also rebuilt its corporate intranet and its retail investment site, iShares.com. All three sites were built on ATG's Dynamo Web platform and share content management tools from Documentum.

When it rolled out its new sites, BGI at the same time revamped its IT structure. A centralized IT group sets all its e-commerce software standards and maintains the Web infrastructure. Responsibility for Web content has been offloaded to regional sites, because the Documentum tools let non-IT personnel publish and maintain content.

At an intermediary level, a group of people called "e-strategists" collect information about Internet projects that are in the works, Kelley says. These strategists meet weekly with corporate IT to discuss new initiatives, compare similarities across regions, and identify gaps where the infrastructure may not be complete enough to deliver what they want to deliver.

By reducing the number of software platforms and standardizing Web content processes, BGI is eliminating duplicate efforts and stretching its IT dollars further, although they won't say by how much.

"If we had been going along the way we were going with the old sites, we would have had to grow our IT resources significantly" to keep up with Web development demand, Kelley says. "In fact, we have not had to do that." ■

www.nwfusion.com

**More online!**

Read about how one cable manufacturer consolidated its ERP systems before launching its Web portal.

**DocFinder: 7030**

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## Patches

continued from page 19

less than two hours, according to ConfigureSoft.

ConfigureSoft has linked SUM with Microsoft's XML Security Database, which provides a knowledge base of new patches. When a new patch is released, SUM screens the patch to determine the products and current service packs that are affected to ensure only relevant patches are applied. The software also lets administrators search for machines to be patched by such criteria as application and registry entry.

SUM includes an automated deployment mechanism for centralized rollouts. Users can choose to modify automatically generated target lists, and specify additional patches to install and schedule deployment times and reboots.

The software also includes a Patch Monitor to ensure that patches are installed properly.

"Configuration data collected by ECM is key," says Alex Goldstein, CEO of ConfigureSoft. "ECM knows the machines and which ones have patches and service packs. Marrying that data with Microsoft's Security Database lets us create a list of target machines."

ConfigureSoft isn't the only vendor attacking the patching problem. Bindview with its bv-Control, Patchlink's Patchlink Update, Ecora's MyEcora and Shavlik's Network Security HF Checker all track patches installed on networked computers. Microsoft also has two tools for checking patches HFNetChk and Personal Security Advisor for the desktop.

Pricing for SUM is $25 per server and $5 per workstation. ECM is priced at $775 per server and $30 per workstation. ECM supports Windows 2000 and NT servers, Windows NT 4.0 and Professional desktops, and Microsoft SQL Server 7.0 and higher.

ConfigureSoft: www.configuresoft.com

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—IDC, June 2001

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—Network World, December 11, 2000

"The Nokia IP530 is truly the best-of-breed platform in the firewall market."
—Information Security Magazine, September 2001

"A formula for earning our Editors' Choice."
—PC Magazine, September 25, 2001

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—Network Computing, May 14, 2001

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# Net.Worker

■ PRODUCTS, SERVICES AND STRATEGIES FOR TYING TELEWORKERS TO THE ENTERPRISE

# Small offices going Gigabit

Need more speed? We put five Gigabit Ethernet starter kits through their paces.

■ **BY MIKE AVERY**

NetworkWorld Review

## Gigabit starter kits

When it comes to performance, so much depends on what you do. Small shops may be small, but if they're using CAD/CAM, multimedia and other bandwidth-intensive applications, they'll enjoy the benefits of a gigabit hardware upgrade as much as a big firm. Prices are coming down, and vendors are responding with gigabit starter kits aimed at small to midsize networks.

Even so, questions remain about performance. Would a typical small office using Word or Excel benefit from a gigabit upgrade? Most importantly, when is it worth the cost?

We tested equipment from 3Com, Compex, D-Link, Linksys and SMC, and our legacy 10/100 network configuration. We were pleased with the speed boost these kits offered, and impressed by the Linksys EG-0801SK Instant Gigabit Etherfast 10/100/1000 8+1 Workgroup Gigabit Starter Kit.

We found for a typical small office, 10/100 Ethernet network serving business applications, the processor speeds of client PCs and servers will prevent it from taking full advantage of the speed. So if your network's running fine, don't buy. But if you need new gear, good-quality gigabit is available for the same price as 10/100 equipment.

### Noises off!

First off, 3Com sent us the wrong switch — one designed for a server room, complete with industrial strength fans. There wasn't time to get one of 3Com's SOHO/small- to midsize-business switches, so we continued testing the model we had.

Because most small-office equipment shares space with staff, noise is a big issue.

Linksys has done away with the fan altogether by designing a case punched with holes, which sits on a stand when stacked, ensuring adequate air flow among units. While the box was slightly warm to the touch, it never got hot. The silence isn't the only thing welcome — no fan equals one fewer point of failure. The Compex, D-Link and SMC switches used fans, but their noise wasn't bothersome.

### Installation issues

Network interface card installations were uniformly easy: We turned off the server, swapped the existing NIC with the gigabit one, plugged the cable into the card and swapped our hub with the gigabit switch. We turned on the server and installed the drivers. The manuals were adequate, and the process only took about 20 minutes.

Under Windows, all the products worked well. NetWare support was another matter. We've found about 65% of our readers still use NetWare in their shops, as do a fair number of small offices, most of whom won't budget money to replace an operating system that works. However, D-Link doesn't offer NetWare drivers with the products or on its Web site, so we couldn't test the D-Link card in our IntraNetWare server. When we loaded NetWare drivers for the Compex and Linksys cards, our server became unstable. There were no updates at either company's Web site. E-mails to each company yielded drivers in a day or two. 3Com and SMC worked well with NetWare.

### Switch shopping

Because the 3Com and SMC switches were pure gigabit (all gigabit ports), you could connect each machine at gigabit speeds, assuming it has a gigabit NIC card installed. Because SMC sent us four gigabit cards, overall system performance was excellent.

So what to buy? If you're using bandwidth-intensive applications or are trying to connect the servers in a small server farm, consider pure Gigabit switches. If you have two key servers, or a key server and a single greedy or needy user, two gigabit ports should do the trick. If you have one server used by most staff, a switch with a single Gigabit port should provide a healthy performance boost.

In terms of cost, D-Link or Linksys can take care of modest speed enhancements for about $250 to $300, plus installation costs. If you do the installation yourself, cost will equal downtime and staff time. If you hire someone, figure an hour per machine multiplied by your contractor's rate. To update up to four servers, SMC equipment will cost about $1,100. But then again, if you aren't suffering performance problems, consider buying a good printer or new tires for the company delivery truck instead.

All the products tested scored high enough to earn our "World Class" award. But because smaller offices are most driven by cost and ease of use, we gave the nod to the Linksys system. It was less expensive than the D-Link (which came in second) and had comparable features and cost, NetWare drivers that worked — and of course that great fanless design. ■

## Short Takes

■ **Cisco** and **IBM** last week joined forces to provide their customers high-speed access and other connectivity services for home and mobile workers. IBM Global Services will provide the wireless network consulting, systems integration, site services and help desk piece, while Cisco will contribute the network hardware and security through its Cisco Mobile Office initiative. Initial target markets include the travel and hospitality industry, and enterprise companies in financial services, business services, government and healthcare.
www.ibm.com, www.cisco.com

■ The first book to spell out the legal aspects of telework was just published by the American Law Institute-American Bar Association. *The Law of Telecommuting*, by attorney Nicole Belson Goluboff ($79) tackles such subjects as employee interstate taxation and corporate state qualification; how Occupational Safety and Health Administration laws affect home workers; workplace privacy rules, home-office zoning requirements, personal injury liability and insurance coverage. The appendix includes a list of "key matters" every telework agreement should include.
www.ali-aba.org

WORLD CLASS WINNER

## Net Results

**Linksys EG0801SK Instant Gigabit Etherfast 10/100/1000 8+1 Workgroup Gigabit Starter Kit 8**

**4.7** RATING

**Company:** Linksys, (800) 546-5797, www.linksys.com **Price:** $250.
**Pros:** Silent because there's no fan; excellent price; good performance.
**Cons:** Not a pure gigabit switch, hard to find latest NetWare drivers.

| What's the score? | Linksys Gigabit Starter Kit |
|---|---|
| Performance 30% | 4.5 |
| Ease of use and installation 30% | 4.5 |
| Price 30% | 5 |
| Documentation 10% | 5 |
| TOTAL SCORE | 4.7 |

**Individual category scores** are based on a scale of 1 to 5. **Percentages** are the weight given each category in determining the total score. ■ **Scoring Key: 5:** Exceptional showing in this category. Defines the standard of excellence. **4:** Very good showing. Although there may be room for improvement, this product was much better than the average. **3:** Average showing in this category. Product was neither especially good nor exceptionally bad. **2:** Below average. Lacked some features or lower performance than other products or than expected. **1:** Consistently subpar, or lacking features being reviewed.

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# ServiceProviders

■ THE INTERNET ■ EXTRANETS ■ INTEREXCHANGES AND LOCAL CARRIERS
■ WIRELESS ■ REGULATORY AFFAIRS

## Q&A IBM sees big growth for e-business hosting services

*Despite recent troubles in the hosting market, IBM says its hosting division is on a roll. Big Blue reported $600 million worth of new customer business during the third quarter and says hosting revenue so far this year totals $1.7 billion, about double a year ago.* Network World *Senior Writer Jennifer Mears recently spoke with Jim Corgel, who took over as general manager of IBM's e-business hosting services in April.*

CATRINA GENOVESE

**How important is the hosting business to IBM's mission, and how does it fit into IBM's overall strategy?**

E-business hosting services are clearly an important element of any e-business strategy. Customers have been working with us since the mid-'90s on 'What is the Internet, and how do I put it to work for me?'

So the e-business hosting services is nothing but an extension of e-business. . . . It was kind of a natural flow for customers to say,'Look I don't have the skill. I don't have the confidence that I can securely manage Web applications to my benefit. So why don't you get involved, IBM, and do this for us, as well.'

**What types of services are you seeing the most demand for today?**

It's in three groups. . . . The least complicated thing we do is to provide collocation services. But the vast majority of all our relationships are with firms that say, 'Not only do I want you to get me connected with the services I already have, but I'm interested in the experience that you have, the know-how that you have in helping me get more for my buck from the Internet than ever before.'

So we tend to quickly move into another set of more managed hosting services where we deliver an infrastructure that is managed by IBM, not by the customer.

And then you get to a third level, which is almost where we run it all. It's very close to traditional outsourcing, so the infrastructure is far more comprehensive.

See Corgel, page 26

## Short Takes

■ **NextWave** has reached a settlement with the Federal Communications Commission and other wireless providers over the disputed spectrum it acquired at auction in 1996. The deal will give the bankrupt carrier more than $6 billion. The government will receive $10 billion, and the wireless service providers will get NextWave's C and F block spectrum licenses. NextWave bid $4.74 billion for the licenses, but filed for bankruptcy in 1998. The FCC reauctioned the spectrum to Verizon Wireless, AT&T Wireless and Cingular Wireless. But NextWave argued successfully that bankruptcy laws protect it from license revocation.

■ More users who want high-speed access at home are choosing cable services over DSL, according to an ARS report. The report says 624,000 users signed up for cable-modem access in the third quarter, compared with 392,000 who opted for DSL.

# Paxson finds security in frame relay

Family-oriented TV network uses mature technology to connect its 65 stations.

■ BY DENISE PAPPALARDO

Keeping 65 TV stations connected across the U.S. can be a challenge, but Paxson Communications has found flexibility and reliability with frame relay.

Although frame relay, at more than a decade old, is considered a mature technology, more users are buying the service today than ever before. Vertical Systems predicts users around the world will spend $12.7 billion on frame relay services by year-end, compared with $10.7 billion in 2000.

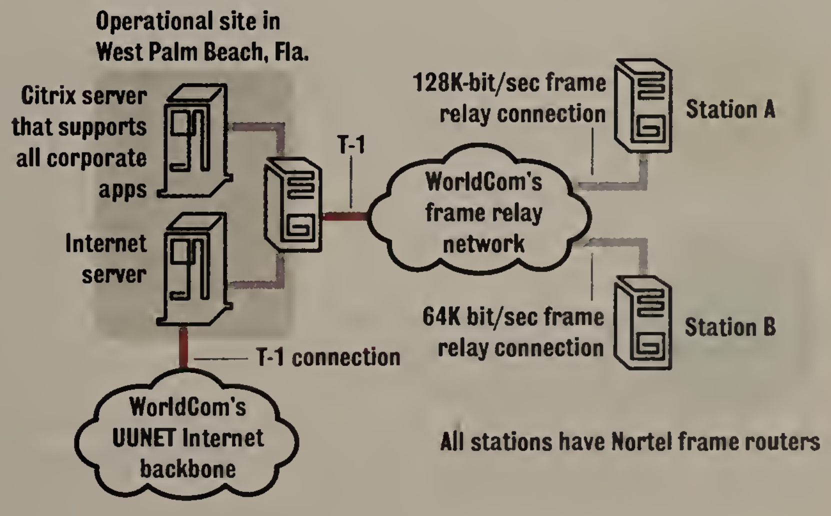
Paxson is one of those users that continues to expand its frame relay network and has done so for the past five years. Paxson originally chose frame relay because "it's cost effective and didn't require point-to-point lines to keep all sites connected," says Lance Singer, network manager at the Tampa, Fla., company. And the technology has continued to meet Paxson's needs as it grew from a small broadcasting company to one of the largest in the U.S.

When Paxson first signed up for frame relay, it only had a few TV stations. By building new stations and acquiring others, the company has grown every year. Singer says frame relay has made that growth a much smoother process. It's painless to have additional frame relay permanent virtual circuits added for every new site, he says.

Paxson uses fractional T-1 frame relay connections from WorldCom at all its TV stations and full T-1 lines at its headquarters in Tampa and its operational site in West Palm Beach, Fla., where Singer is based. The company has Nortel frame relay routers deployed at all its sites.

### Paxson's frame setup

**Paxson keeps its 65 television broadcast stations connected to its operations site and the Internet through its frame relay network. The company also runs a thin client Citrix environment, which fits well with its centralized network model.**


Operational site in West Palm Beach, Fla.
Citrix server that supports all corporate apps
Internet server
T-1
T-1 connection
WorldCom's frame relay network
WorldCom's UUNET Internet backbone
128K-bit/sec frame relay connection
Station A
64K bit/sec frame relay connection
Station B
All stations have Nortel frame routers

The broadcasting company is satisfied with WorldCom's customer service and says it gets competitive pricing.

The company uses its frame relay network to monitor quality

See Paxson, page 26

EYE ON THE CARRIERS

Lisa Pierce

# Cingular-VoiceStream: Joint venture? Merger?

In recent weeks, Cingular has gone on a virtual tear of seemingly important strategic announcements. But in many respects, its directional statements leave more questions than answers.

It's the unanswered questions that are most significant to companies.

Let's examine the formation of a joint venture between Cingular and VoiceStream, which will support GSM roaming between three significant home territories: those Cingular controls in California and Nevada, and those VoiceStream owns in New York.

This is not the first time they've cooperated with each other; they began a co-marketing/GSM roaming arrangement late last year. Neither provider has enough customers in the others' territory to warrant the expense associated with a full competitive GSM/General Package Radio Service (GPRS) spectrum buildout. That's the rationale for this business agreement.

The long-term question for each carrier is: Will this strategy provide each with enough breathing room to build up a local in-region customer base — enough of a base to someday warrant returning to business as usual?

Of course, the industry wants to know if this is truly a joint venture. In my view, too many important questions remain, such as how the venture will handle personnel or capital investments, local asset management, customer service and support issues, or expenses associated with plant maintenance. Two important forward-looking issues are how they will reach a consensus on the demand forecasts each will develop for these (shared) markets, and how they will determine the contribution each will make on any requisite incremental capital expense.

Based on the lack of information, I'd categorize this as more of a co-marketing effort than a joint venture, along the lines of the now-defunct WorldPartners. "Who?" you ask. My point exactly.

Even if this were a joint venture in which the two providers put some skin in the game, it would face immense challenges. The telecommunications landscape is littered with the rusting hulks of such arrangements. They simply don't work. Concert is a recent case in point.

At this time, the most likely long-term outlook for Cingular is an all-out merger with VoiceStream. Certainly this would occur if BellSouth merged with Sprint (and Sprint PCS). In so doing, it would have no need to retain its share of Cingular. In all probability, SBC Communications would seek a buyer for BellSouth's 40% stake — enter VoiceStream.

Absent the BellSouth/Sprint scenario, VoiceStream's small market share casts long shadows over its long-term prospects as an independent entity. Its most likely suitors are other GSM providers, thus its ultimate fate lies with AT&T Wireless or Cingular.

No point in looking at AT&T, so will Cingular be interested? Eighty percent of Cingular's network uses Time Division Multiple Access technology, and the cost to upgrade to GSM, GPRS and Enhanced Data for Global Evolution, and to acquire and retain customers, is very significant. Capital expense associated with these activities is currently estimated at $5.8 billion. That's $5.8 billion-plus worth of incentive to merge with VoiceStream, so I anticipate it will.

Given the uneven success rate enjoyed by previous telecom mergers, should companies be concerned about this prediction? Not this time. Unfortunately, the joint venture's functions are so amorphous that a merger will almost certainly result in improvements along critical dimensions such as network reliability and customer service and support — particularly for customers in New York, California and Nevada.

Additionally, Cingular itself is a joint venture and obviously is having a tough go in one critical national market — New York. Ultimately, here's the relevant question: Why not merge with VoiceStream sooner rather than later?

*Pierce is a research fellow at Giga Information Group. She can be reached at lpierce@gigaweb.com.*

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Q A

## Corgel

continued from page 25

**How do you see the hosting industry these days?**

As something that's growing. Knock on wood. I like the hosting business, and we see a lot of opportunities.

**Has the downturn affected IBM's hosting strategy?**

Not yet. We still see growth in our opportunity.

**Has demand slowed at all?**

There's no question there's been somewhat of a slow growth in the U.S. But we've had uptick in Europe. So overall, I look at my business on a global basis. I see a breakthrough in a country [such as] Japan, where culturally in years past the word "outsourcing" wasn't totally accepted.... But the tragedy on Sept. 11 has caused every businessperson to pause, and surely we see some effect from that.

**What type of flexibility do customers have as far as hardware they can use within an IBM Global Services data center?**

The first thing we ask a customer is what their current investment is. First and foremost, we're a services business. So we do run into an awful lot of IBM technology that's been purchased in the past.... But if you walk through the aisles of my data centers around the world, you'd see a wide variety of technology. That's what makes us an attractive service provider because we have skills and capability in any brand you can name.

**What sets IBM apart from managed hosting providers such as Digex and Digital Island?**

It's mostly our experience. We've been moving data centers around for 30 years, so whether it's building an infrastructure that's secure and reliable, whether it's taking an investment for a start-up and making sure that it's well lit on the Internet, that doesn't frighten us a bit. And it's primarily because we've got so many years of experience in making the right kind of infrastructure investment so we can be affordable and competitive in the way we price our offerings.

**What is IBM planning to invest in IBM Global Services? Will more data centers be built?**

If there's a need. Today, we're pretty comfortable with what we have.... We have an outstanding relationship with people like Bell Canada, Qwest, Equinex and Shanghai Tel. We have a good strong partner strategy.... We're not interested in empty spaces any more than anybody else is.

**What can companies expect from IBM Global Services in the future?**

You'll see us spend a lot of time on what I would call an e-sourcing strategy. An e-sourcing strategy more often than not goes something like this: Customers will tell us that they have right-sized their IT infrastructure. . . . Many customers, though, are stopping and realizing that the next big thing perhaps is how do you provision hardware, software and services as quickly as possible and as flexibly as possible right over the Web. And so we're working with a number of clients today to begin to build a game plan that allows for provisioning of hardware, software and services over the Web.

**As you move into e-sourcing, will there be services available that aren't available today?**

Oh yeah. Customers today are asking for what I call seasonal provisioning. So if you're a retailer, you don't know, you can't predict often what the capabilities are that you're going to need from November to mid-January. . . . Providers like IBM need to change and be as flexible as we can for those kind of customer situations and be the first to market with that kind of flexibility. ■

**More online!**

Read why outsourcing option are on the rise and get links to our breaking outsourcing news.

**DocFinder: 7032**

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## Paxson

continued from page 25

control at its broadcast facilities.

"We have remote-control access over all the equipment at the stations, which allows us to review quality and make sure everything looks as it should," Singer says. Paxson monitors all its sites regularly, but the schedule of that monitoring changes periodically, he says. Engineers in West Palm Beach access broadcast content from sites throughout the country.

Singer also supports a thin-client Citrix environment for Paxson employees. Users access the main Citrix server in West Palm Beach, where they access Paxson's corporate applications. This lets Singer more easily support users around the country, while keeping network costs down.

"We're using a variety of fractional T-1 bandwidth at all sites," he says. "Frame relay allows us to easily upgrade bandwidth when traffic usage increases."

WorldCom offers its Private IP service, which lets users set up a fully meshed frame relay network, but Singer is not interested. His centralized Citrix environment eliminates the need for each site to directly communicate.

Users also access the Internet through Paxson's frame relay network. Paxson has a separate dedicated T-1 connection to WorldCom's UUNET backbone at its headquarters. Employees click on different server icons that appear on their PC screens when they want to connect to the 'Net.

Before moving to frame relay, Paxson used dial-up for all its sites, which was time-consuming and unreliable. Singer says Paxson can continue to grow with frame relay, especially because higher

# The Edge

■ SERVICE PROVIDER DEVELOPMENTS
AT THE JUNCTURE BETWEEN THE ENTERPRISE
AND THE NEW PUBLIC NETWORK

# Start-up intros new mobile gateway

## Starent's ST16 is a router with a mobile brain.

■ **BY TERRI GIMPELSON**

TEWKSBURY, MASS. — Wireless start-up Starent Networks unveiled its first product, the ST16 Intelligent Mobile Gateway, which is designed to put more data traffic into the wireless network.

Starent was founded in August 2000 to develop products that integrate voice and data for wireless networks. Its initial IMG will feature only data capabilities.

The ST16 takes data traffic from the radio network and puts it on an IP network, such as the Internet, at 150K bit/sec. Traffic from the radio network is packetized via a reformatting scheme that Starent designed for transportation through the Starent box.

The ST16 classifies the traffic, applies quality-of-service metrics, bills network usage to customers and manages operation and performance, Starent officials say. Voice capabilities will be added for the second phase of the product release, expected by year-end 2002.

The box was also designed with the ability to evolve from 2.5G to 3G and onto all-IP technology. It supports Linux, and Starent is working with several service providers to develop mobile applications for the ST16.

The IMG is capable of 1-to-1 and 1-to-many redundancy, Starent says, and can serve as a Packet Data Servicing Node/Home Agent (PDSN/HA) and a Gateway General Packet Radio Services Support Node (GGSN). A PDSN/HA connects the radio access network to the application or service, and the subscriber's anchor point for identity.

A GGSN is the interface between GPRS and IP traffic. It also can connect the GPRS service nodes to IP data networks.

The ST16 can also work as an access gateway and a media gateway, the company says.

Starent recently announced that Samsung chose its ST16 product for "significant" infrastructure deployments. Samsung will use the box in its Korean infrastructure as part of a 3G deployment of Code Division Multiple Access 2000 1x technology.

The ST16 is currently in beta tests. It will be generally available in the second quarter of 2002.

Starent: www.starentnetworks.com

### ■ PROFILE: STARENT

| | |
|---|---|
| **Location:** | Tewksbury, Mass., and Chicago |
| **Founded:** | August 2000 |
| **Product:** | ST16 Intelligent Mobile Gateway |
| **Financing:** | $32 million total from Matrix Partners, North Bridge Venture Partners and Highland Capital Partners. |
| **Competitors:** | Include Tahoe Networks, WaterCove Networks. |
| **Employees:** | 100 |
| **Fun fact:** | Ashraf Dahod, the company's president, developed the patent for the cable modem. The company also has an annual Fall Classic dart tournament. |

## Short Takes

■ **Nortel** last week announced shipment of a new release of its metropolitan dense wavelength division multiplexing systems. **OPTera Metro 5200 Release 4.0** includes software enhancements to simplify deployment and configuration, and new hardware with per-wavelength scalability up to 10G bit/sec and support for SONET/SDH, OC-192/STM64 and 10G-bit/sec Ethernet applications. Nortel says it will also offer the OPTera Metro 5200 Release 4.0 as a smaller, easier-to-install cabinet. OPTera Metro Cabinet is designed for deployment times of four hours, vs. typical deployments, which can exceed 30 hours. The cabinet will be available in December.
www.nortelnetworks.com

■ **Cisco** and **Cirpack,** a vendor of packet telephony equipment, have announced that Cisco's integrated access devices are compatible with Cirpack's voice gateways and softswitches. The combination of Cisco's **IAD2420** and Cirpack's **G16M V5.2** gateway and S5 Class 5 softswitch lets service providers offer voice-over-DSL services without investing in local exchange switches, the companies say. The Cirpack G16M gateway connects the DSL local loop to the Class 5 local exchange switch equipped with E-1 or SDH time-division multiplexer interfaces.
www.cisco.com, www.cirpack.com

# Equipe preps ATM/IP switch for MPLS

■ **BY JIM DUFFY**

ACTON, MASS. — ATM/IP switch start-up Equipe Communications plans to unveil next spring the IP portion of its switch, a processor that lets users set up Multi-protocol Label Switching paths over an ATM or IP core network.

The MPLS Interworking processor will debut around June. Equipe will demonstrate it at SuperComm 2002, interoperating with Juniper Networks routers to set up MPLS Label Switched Paths (LSP), passing traffic and maintaining quality of service, Equipe officials say.

However, they would not say if the demonstration would support voice and video traffic over the LSPs.

The 10G-bit/sec MPLS Interworking processor for Equipe's E3200 switch will ship in the first half of 2002, Equipe says. The company proposes a three-phase strategy for service providers migrating an ATM core to IP/MPLS.

The first phase is to scale the current ATM core beyond 25G bit/sec, which is the capacity of Lucent's current core ATM offering, the GX 550 (Equipe says with Automatic Protection Switching turned on, the GX 550 actually only delivers 12.5G bit/sec). Equipe's E3200 scales to 320G bit/sec.

The second phase would be to migrate nonreal-time traffic over to MPLS LSPs. In this phase, end-to-end ATM signaling and service provisioning is preserved, Equipe says. Constant bit-rate and variable bit-rate traffic stays in ATM permanent virtual circuits, while unspecified bit rate is mapped onto the MPLS LSPs.

Equipe says there's a 1-to-1 mapping of ATM virtual circuits to MPLS LSPs in the E3200 switch, which it says supports 256,000 virtual circuits.

In phase three, real-time traffic migrates to the MPLS core. Because of service providers' current reliance on an ATM core for revenue generation and the immaturity of MPLS, Equipe does not envision this phase for four or five more years.

Equipe plans to keep ATM and MPLS signaling, control planes and traffic separate to minimize any service disruption.

The company is not currently testing MPLS interoperability with Cisco's GSR 12000 routers, but expects to have one in its labs within two months. Equipe is also anticipating a new version of Cisco's MGX 8850 ATM switch, with MPLS migration capabilities, soon.

Meanwhile, the Equipe 3200 switch will ship in an ATM-only iteration in the first quarter of 2002, with OC-192. It will interoperate with Lucent's GX 550 and CBX 500 ATM switches via a Virtual Network Navigator-to-Private Network-to-Network Interface gateway on the Lucent switches. Virtual Network Navigator is Lucent's Open Shortest Path First-based routing architecture. ■

**More online!**

Read how Equipe Communications will unveil its flagship product to bridge ATM and MPLS networks.

**DocFinder: 7029**

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# Technology Update

■ AN INSIDE LOOK AT THE TECHNOLOGIES AND STANDARDS SHAPING YOUR NETWORK

# Point-to-Multipoint DWDM raises optical reach

■ **BY JEFF GWYNNE**

Point-to-Point dense wave division multiplexing is a technology that lets service providers transmit more than one lambda, or wavelength, between two locations.

Given the enormous capacity multiple wavelengths provide, in most applications the two locations connected by Point-to-Point DWDM are typically central offices or large, multitenant office buildings that generate and consume large amounts of bandwidth.

Taking the concept of Point-to-Point DWDM to a new level is Point-to-Multipoint DWDM, which differs in the number of endpoints that receive the traffic.

In metropolitan areas, DWDM initially provided carriers with the ability to significantly increase the capacity of fiber strands, thereby providing favorable economics.

However, the downside to the technology is that a positive return on investment is achieved only when it serves the largest enterprise customers that generate significant recurring monthly revenue streams.

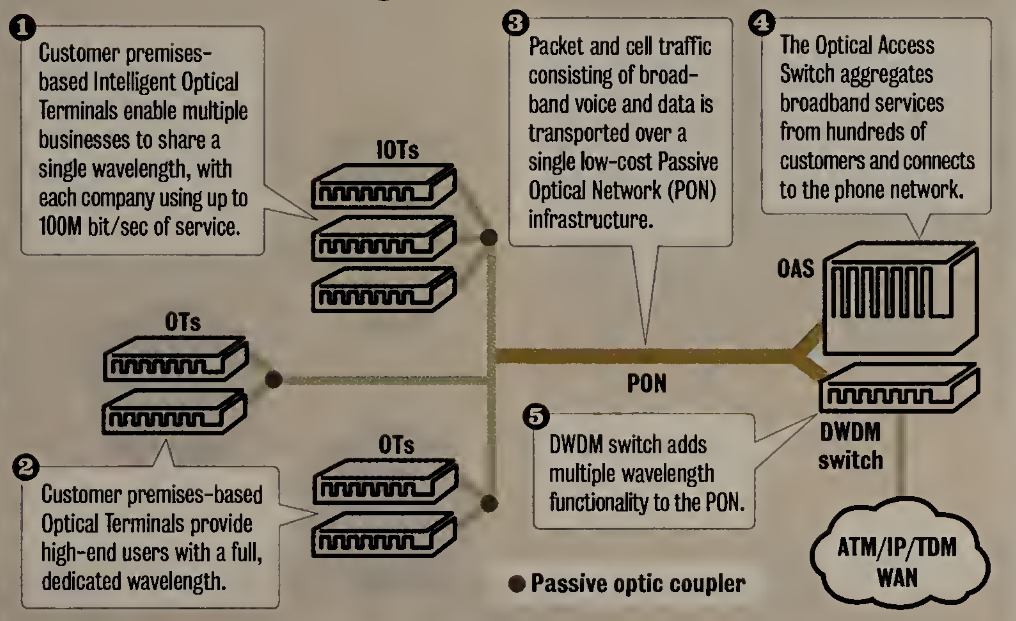
That ignores 90% of enterprise customers, however. The emergence of Passive Optical Networking (PON) makes it possible for carriers to deploy wavelength, multiwavelength and fractional wavelength services to enterprise customers over the same fiber infrastructure.

Now carriers can use one infrastructure to serve all their customers — large and small — while easily scaling to provide higher service levels as more customers embrace value-added services such as storage-area networks (SAN) and virtual LANs.

■ **HOW IT WORKS**

**Point-to-Multipoint DWDM**

**Point-to-Multipoint Dense Wave Division Multiplexing (DWDM) lets many companies share a single optical wavelength.**



① Customer premises-based Intelligent Optical Terminals enable multiple businesses to share a single wavelength, with each company using up to 100M bit/sec of service.

② Customer premises-based Optical Terminals provide high-end users with a full, dedicated wavelength.

③ Packet and cell traffic consisting of broadband voice and data is transported over a single low-cost Passive Optical Network (PON) infrastructure.

④ The Optical Access Switch aggregates broadband services from hundreds of customers and connects to the phone network.

⑤ DWDM switch adds multiple wavelength functionality to the PON.

## The components of Lamda-PON

Point-to-Multipoint DWDM based on PON consists of these elements:

- A DWDM switch collocated with an Optical Access Switch (OAS) in the central office.
- An Optical Transponder or Intelligent Optical Terminals (depending on the rate of service) on the customer premises.
- A PON between the central office and the customer premises.

Among the key elements of a PON are the passive couplers and splitters deployed in the outside plant that combine or split the laser signal at each junction point. Because these splitters and couplers are fiber, once the carrier installs the outside plant network, all changes and upgrades occur only at the endpoints. This eliminates the need and expense of making changes to the outside plant.

The collocation of the DWDM switch and the optical access switch in the central office allows the transmission of fractional and dedicated wavelength services over the same PON. For customers requiring a dedicated wavelength, the DWDM switch transmits wavelengths through the OAS and onto the PON at a frequency predetermined for each end customer. While this traffic travels through every splitter and coupler, and reaches all endpoints, each optical transponder is outfitted with a filter that only receives the signal that is intended for it, ensuring that data is secure and that each customer is receiving the correct service level.

For customers receiving fractional wavelength offerings, service is originated and aggregated at the optical access switch in the central office, without involving the DWDM switch.

The traffic then travels at a maximum speed of 622M bit/sec downstream along the PON and is terminated at each customer location by optical terminals equipped with T-1 and Ethernet interfaces.

Enterprise customers receiving fractional wavelength services have the option of choosing between 10M and 100M bit/sec of service.

When demand surpasses 100M bit/sec, companies can upgrade to a dedicated wavelength offering (2.5G bit/sec) without changes to the outside plant or service disruptions.

The ability to operate a single, future-proof fiber infrastructure capable of serving all types of enterprise users brings with it a tremendous opportunity for carriers and corporations. As a result of the precision of today's optics, a single PON can support multiple traffic types and data rates to serve businesses of all sizes, minimizing carriers' operational and capital expenditures.

For companies, the economical Point-to-Multipoint DWDM services that PON enables bring with them a new breed of applications such as SANs and VLANs.

*Gwynne is a co-founder and senior vice president of marketing at Quantum Bridge Communications in Andover, Mass. He can be reached at gwynne@quantumbridge.com.*

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# Ask Dr. Internet

by Steve Blass

**Your column on peer-to-peer VPNs (www.nwfusion.com, DocFinder: 7022) was interesting. I got your Windows 2000 Professional Routing and Remote Access Services VPN suggestion to work, but it is not quite what we were looking for. Could you elaborate on the Web-based gateway-type services you mentioned at the end of the column?**

Two that I have used are Groove from www.groovenetworks.com and GoToMyPC from www.gotomypc.com. Groove is a full-service, peer-to-peer networking product for Windows 98 and above that provides collaboration tools such as a whiteboard, audioconferencing and file sharing. The preview edition of Groove is free. Installation is straightforward, and you invite participants who have also installed Groove to join workspaces you create using the tool set. GoToMyPC is a Web-based remote access solution for systems running Windows 95 and up. Free trial use is available for starters; then the service costs about $10 per month for a single PC. You install the server component on your PC and establish a logon at the site and a personal identification number for your computer. To access the PC from the Web, log on and download a plug-in.

**Blass is a network architect at Change@Work in Houston. He can be reached at dr.internet@changeatwork.com.**

**GEARHEAD INSIDE THE NETWORK MACHINE**

Mark Gibbs

# Early Christmas presents

If we didn't know better we could swear that X10 is dogged by malevolent spirits that exist just to foil our best endeavors. Thus it is that we must defer our final X10 product review for another week and resort to recommending a way-cool Christmas gift.

The product in question is a tiny radio controlled, $60 tracked vehicle called the Desktop Rover made by Plantraco (www.plantraco.com).

The Rover is about 4.5 inches long, slightly less than 2.5 inches wide and 1.75 inches tall with a 6-inch whip antenna. You can order a Rover set to one of four radio control frequencies (26.995 MHz, 27.095 MHz, 27.195 MHz or 27.255 MHz), which allows up to four vehicles to run simultaneously.

Those devices are way cool for several reasons, not the least of which is you can control the machines on a client/server basis over a TCP/IP connection (that's our tenuous tie to networking and the whole reason we can review it).

And unlike most radio-controlled devices, the radio link sends commands as binary data to a microprocessor onboard the Rover. And as a consequence, Plantraco has provided a RS232 serial or universal serial bus (USB) interface to the transmitter.

The control software is called Telecommander and retails for $60 for the software with serial cable included, or $70 with USB cable included.

We had fun decoding the link commands — a process that simply required us to plug a PC running the Telecommander software into another PC using a null modem cable and running a serial interface analyzer. Voilà! Code cracked.

The coding is simple: Using seven bit bytes with no parity, if the least significant bit is set to one it represents left-motor reverse; the next bit left-motor forward; then right-motor reverse; right-motor forward; fire and reload; and finally, a byte of zeros means stop whatever you're doing.

Thus, forward has a decimal value of 10, rotate clockwise is six, and so on. We'll leave it as an exercise for you to fill in the rest of the permutations.

"Wait a second," you exclaim with delight, "Did you say fire and reload?" Yep, there's an LED at the front of each Rover that can be fired at other Rovers. And when six hits are scored on your opponent, the target Rover goes inactive and requires resetting (and the device is therefore disqualified from being an Ultimate Couch Potato Toy because you have to get up and switch it off and on if you want to continue playing).

**GEARHEAD RATING**

**10**

**Plantraco's Desktop Rover**

**1=awful, 10=insanely great**

The Telecommander control application is pretty interesting — written in Java using a range of freeware tools with code from the Sourceforge open source "finj" FTP project (provides embedded software update service) and a whole lot more (see Plantraco's interesting software development overview at www.nwfusion.com, DocFinder: 7047).

Telecommander can be run in manual mode where you click on icons and the Rover immediately responds, macro mode where the Rover executes a stored sequence of instructions, and server mode, which executes its local macros for another PC running Telecommander in remote mode.

We found some bugs in the first version of the software. For example, problems with correctly identifying the client IP address when multiple adapters were available. But we suspect that they can all be easily fixed.

Another Java project Plantraco has on exhibit is an online Telecommander demo. This is an applet that streams a view of a Rover on a Mars-like landscape, and you can control it. (Note to Plantraco: Could you please make the duration we get to control the Rover longer? We'd just got the Rover unstuck from the left edge of the screen when we timed out and had to rejoin the queue.)

This is a great toy and one that every geek parent should buy for their child's Christmas stocking (or even their own). There's also a wireless color camera module that can be mounted on the Rover or even on one of Plantraco's radio-controlled blimps. Perhaps we'll have a chance to review these products at some juncture.

Great gadget: Ten gearteeth out of 10!

*Roaming thoughts to gearhead@gibbs.com.*

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**Cool Tools**

**Quick takes on high tech toys**

**KEITH SHAW**

Lord of the Things

# It's a camera, a PDA, a phone! It's Origami!

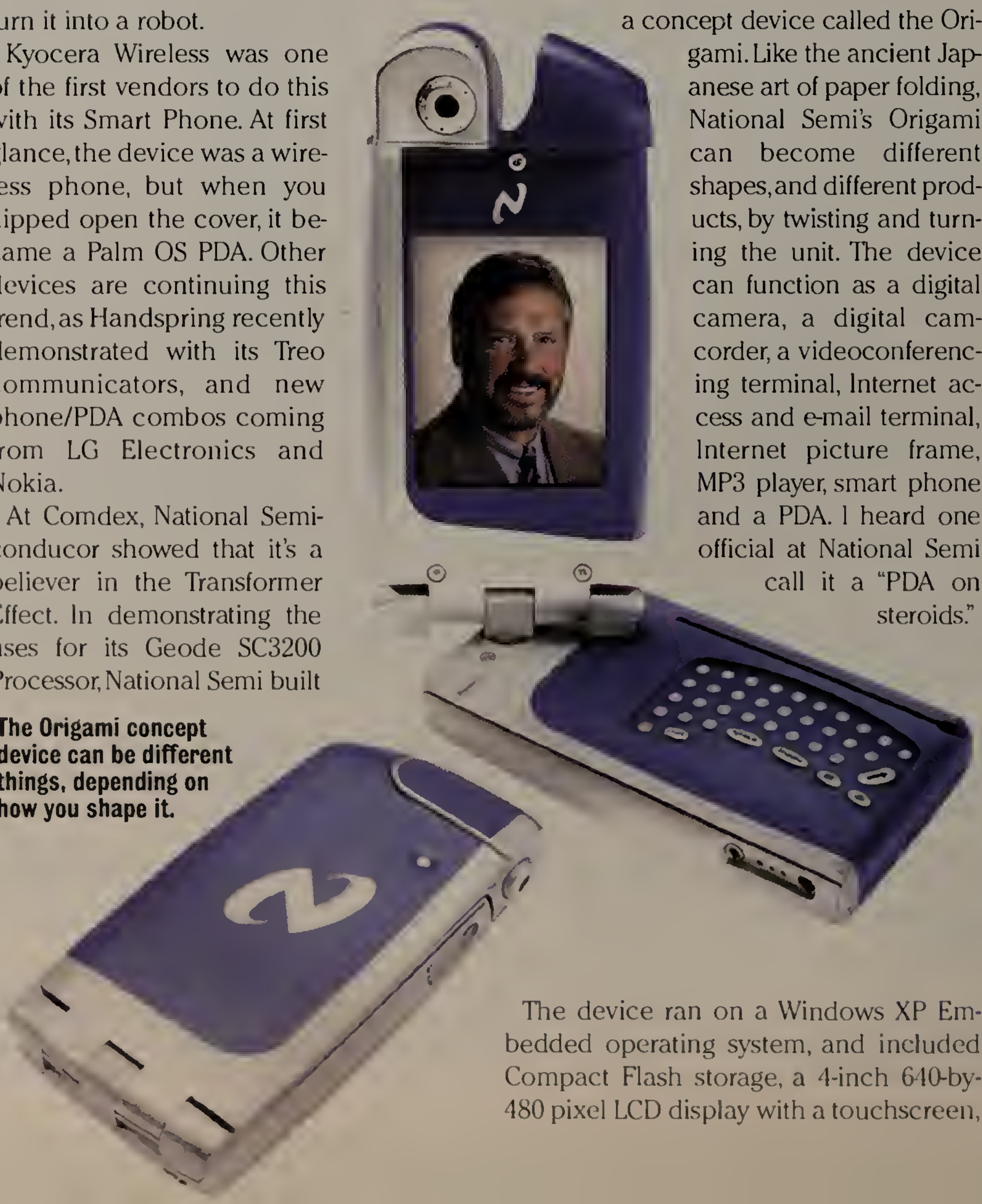
Apart from the lines of people waiting to play Microsoft's new Xbox video game platform, Comdex 2002 wasn't as crowded as previous years. That said, there were still plenty of cool things to see on the show floor, especially the new concepts that vendors will try to develop into products over the next few years.

Mobility and wireless continues to be a trend, with almost every major vendor adding some kind of wireless connectivity to their products. If a product doesn't have either an 802.11b or Bluetooth connection, it might as well be sitting in a corner collecting dust.

But I noticed another trend in devices, something I'm calling "the Transformer Effect." It's more than just convergence, which has been happening over the past few years. The Transformer Effect is taking one device and turning it into another device with a few clicks, swivels or button pushes. If you're blocking out the 1980s, Transformers were toys that could "transform" into other toys by shifting and clicking. You could take a car or a boat and turn it into a robot.

Kyocera Wireless was one of the first vendors to do this with its Smart Phone. At first glance, the device was a wireless phone, but when you flipped open the cover, it became a Palm OS PDA. Other devices are continuing this trend, as Handspring recently demonstrated with its Treo communicators, and new phone/PDA combos coming from LG Electronics and Nokia.

At Comdex, National Semiconducor showed that it's a believer in the Transformer Effect. In demonstrating the uses for its Geode SC3200 Processor, National Semi built a concept device called the Origami. Like the ancient Japanese art of paper folding, National Semi's Origami can become different shapes, and different products, by twisting and turning the unit. The device can function as a digital camera, a digital camcorder, a videoconferencing terminal, Internet access and e-mail terminal, Internet picture frame, MP3 player, smart phone and a PDA. I heard one official at National Semi call it a "PDA on steroids."



The Origami concept device can be different things, depending on how you shape it.

The device ran on a Windows XP Embedded operating system, and included Compact Flash storage, a 4-inch 640-by-480 pixel LCD display with a touchscreen, a mini keyboard, universal serial bus expansion ports, and came with either Bluetooth or 802.11b wireless LAN options. It also had a camcorder that can double as a digital camera.

Because this is a concept, don't expect to see this product on store shelves any time soon. But National Semi has a good track record with concept devices; a few years ago it developed what is now known as Web tablets (or Web pads).

Another concept device I saw was from Hewlett-Packard, which wanted to share its vision of the notebook computer. This also fits into the Transformer Effect trend, because the notebook can swivel its screen around 180 degrees (perfect for PowerPoint presenters). After folding again, you can place the notebook onto a specially designed docking station and rotate it again depending on whether you want your screen to display like a portrait or landscape. Again, this is a concept, it might look much different by the time production models are released.

Still, it's pretty cool to see what some really smart people are thinking about in terms of building devices that can improve our productivity. Now if one can just turn into a race car, we'll be all set.

*Send news of cool stuff to kshaw@nww.com.*

# BUSINESS-CRITICAL Switching

**Performance, scalability, and services packed into the Cisco Catalyst 6500 Series**

IT IS AN INDISPUTABLE FACT in the e-business world that the speed at which revenues flow from new applications is directly related to the speed at which these applications can be deployed. Quickly deploying these applications is the cyber-world's equivalent of rapidly building brick-and-mortar storefronts to capture new customers.

And because new business applications can sometimes generate sudden and sustained bursts of increased business activity, the underlying network infrastructure must be both scalable and full-featured to support the demands of client services.

To meet these and other lofty requirements of Internet business applications, Cisco Systems offers the Catalyst 6500 Series platform for both enterprise and service-provider networks. In addition to being the fastest switch series available today, the Catalyst 6500 Series is designed from the ground up to address the toughest network challenges, including:

- High availability, performance, and scalability
- Intelligent multilayer switching
- Increased requirements for gigabit switching density
- Voice and data integration
- LAN/WAN/MAN convergence

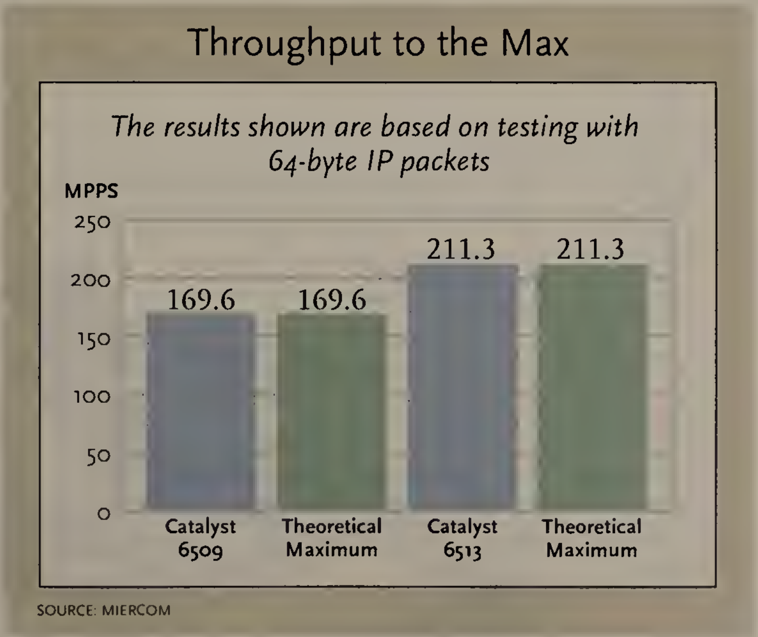
## PROOF POSITIVE

"With the recent introduction of the Cisco Catalyst 6513, the latest member of the Catalyst 6500 Series," says Ben Goldman, manager, product marketing for the Catalyst 6500 Series, "Cisco has proven that we can continue to scale bandwidth, performance, and density while maintaining line-rate intelligent services."

That's been borne out by independent lab tests of Cisco's Catalyst 6509 and Catalyst 6513 switches, which showed stunning aggregate throughput with equally stunning services enabled performance. Test engineers from Princeton, NJ-based Miercom, a leading independent product testing lab, put the switches through a comprehensive set of tests that included "abnormally stressful tasks and network failures."

Even under extreme duress, the Catalyst 6500 series switches delivered "full line-rate performance with low levels of latency and no packet loss, no matter how large the packet in the test." By maintaining a consistent and low level of latency, the switches' performance clears a major and business-critical hurdle in supporting delay-sensitive applications, including IP telephony and video conferencing.

When Miercom's engineers configure the Catalyst 6500 Series switches with multiple advanced features, the switches suffered no performance degradation or changes in latency. And as shown in the chart, the aggregate throughput of each switch equaled the theoretical maximum—better than 210 Mpps, for the Catalyst 6513. (A complete report of this stunning test is available as a printable PDF at *www.cisco.com/go/6500miercom*).



SOURCE: MIERCOM

*Cisco Systems offers the Cisco Catalyst 6500 Series platform—with the latest Catalyst 6513 Switch.*

Moreover, Miercom's tests found that the Catalyst 6500 switches continued to provide advanced services while consistently maintaining performance under heavy traffic loads. Such performance and service provisioning is vital for environments in which users expect a switch to maintain peak performance, even if it is employing multiple advanced features while being hit with various network flaps and glitches.

## CATALYST FOR QUALITY

The Catalyst 6500 Series supports Cisco IOS software, which delivers a comprehensive suite of services for managing network security, allocating and enforcing QoS, and enabling network resilience. Quality of service is the lifeblood of Internet business applications. In its tests, Miercom simulated various system failures, and each time the Catalyst switches posted the "exact same results, confirming that common logic failure has no effect on QoS enforcement."

"For today's enterprise and service provider networks, it is essential to have the capability to deploy Internet business applications on a highly scalable infrastructure," notes Peter Alexander, vice president of marketing at Cisco's Internet Systems business unit. "The Catalyst 6500 Series is not only scalable, it also has the high availability and key network services required by today's most demanding business environments."

The Catalyst 6500 Series is a key element of the Cisco Content Networking architecture, designed to deliver Internet business applications including e-commerce, supply chain management, and workforce optimization.

For more information on the Catalyst 6500 Series and on Cisco's Internet networking solutions, click on *www.cisco.com/go/catalyst6500*.

# opinions!

**EDITORIAL**

John Dix

## New realities, post-9/11

In this issue we bring you a collection of stories about the role technology played in the aftermath of the Sept. 11 attacks and where we go from here (coverage starts on page 36).

There are more than a few lessons, but perhaps the overarching one is that technology designed to help organizations cope with disaster actually works and is worth every penny. Could we do better? Yes. This was a wake-up call that has companies across the country second-guessing everything from disaster recovery to data security.

But our spending survey (see page 53) also shows company confidence in the resilience of existing infrastructure. While 37% of our readers say the events of Sept. 11 have forced them to ratchet up or reallocate their IT budgets, 63% say they will stay their current course.

In fact, the souring economy is causing more havoc with IT than Sept. 11. Some 80% of our survey respondents said the economy is responsible for delaying technology upgrades vs. only 5% who cited the attacks as being the cause of those delays. Of course the attacks only further affected the economy, so it is something of a chicken-and-egg problem.

But there may be light at the end of the tunnel. Anecdotally, consider that Comdex two weeks ago was smaller than usual but still vibrant, Cisco's sales have rebounded a bit, and the Nasdaq is up 34% from the low it hit in September.

More good news: Our spending survey shows IT budgets increasing almost 4% next year. While that pales compared with the 10% jump between 2000 and 2001, it isn't bad considering the current environment.

Is the hike sufficient to fund the initiatives you need to launch given increased concern in the boardroom over things such as disaster recovery and data security? Most of you say no, meaning you'll be whipsawed by the obvious conflict.

Innovation and creative reallocation will be key to making do in 2002.

Of course some technologies answer the post-Sept. 11 workforce demands while saving money, a win-win. Web- and videoconferencing tools that reduce the need to travel seem to be gaining favor, and there seems to be a marked uptick in demands to work from home, which is all the easier with advances in everything from VPNs to home gateways.

One thing is clear: Things have simply changed. IT spending from here on will need to reflect new realities.

— John Dix
Editor in chief
*jdix@nww.com*

### Comfort zone

In his "Backspin" column "The new battleground" (www.nwfusion.com, DocFinder: 7024), Mark Gibbs states: "...but there's a general feeling of gloom that also makes traipsing around stores unappealing ... and as a consequence of not wanting to go out, many of us will shop online."

I'm not so sure we'll see a huge increase in e-shopping this year. Despite the security risks Gibbs mentions, there's also the perceived risk of having packages delivered to your doorstep.

After the first anthrax report, my wife forbade our three children — all teenagers — from getting the mail out of our mailbox.

Many people feel more comfortable going to stores to buy something than getting cryptically identified brown cardboard boxes in the mail.

Art Kraus
Meteorologist
National Weather Service
Mount Holly, N.J.

### Cheapest may not be best

I am an engineer for a local exchange carrier. Howard Anderson's column "A tale of two countries" (www.nwfusion.com, DocFinder: 7025) underscores the frustrations we face trying to solve customer problems. Until our regulatory agencies decide to establish unilateral codes of business practices and all players in the field are playing by the same rules, the incumbents will find it difficult and sometimes disadvantageous to continue to build new infrastructure and services.

As a nation, we seem to have forgotten the element of public service in our public utilities. What will happen when the "lowest bidder" or "cheapest provider" is asked to enhance or strengthen our public communications networks and services? Will they have the desire, resources or ability?

Is it time for us to re-evaluate our current course and methodology in delivering services in our country — or do we wait until services finally reflect the absolute cheapest service that can be provided?

Dan Kline
West Bend, Wis.

*E-mail letters to jdix@nww.com or send them to John Dix, editor in chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.*

### Overstating Cisco

Regarding "Cisco's big bet" (www.nwfusion.com, DocFinder: 7026): I am amazed at the amount of coverage Cisco has received for its voice-over-IP products, which lack basic features that voice-over-IP products from vendors such as Nortel and Avaya offer. I am also skeptical of the figures that indicate Cisco market leadership in the voice-over-IP arena. I know that Nortel and Avaya have shipped thousands of voice-over-IP products — many more than 3Com and I suspect more than Cisco if you subtract the number of voice-over-IP units returned.

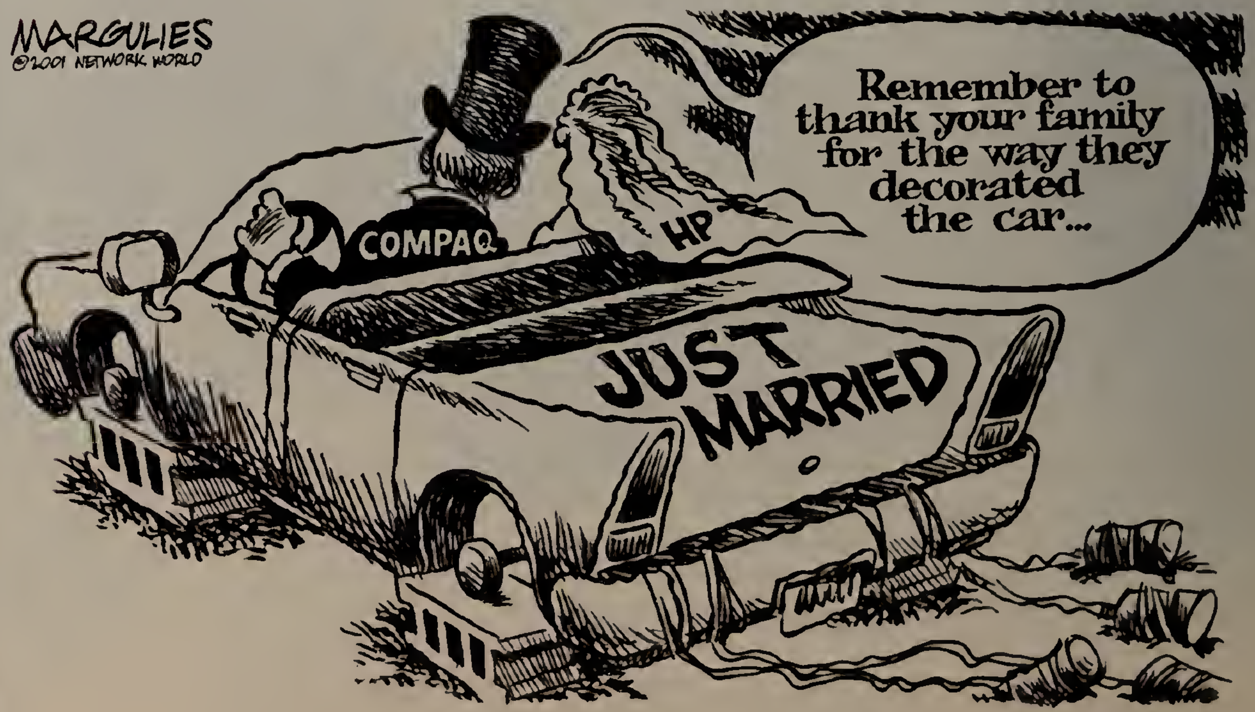
Horace Spreen
Network design specialist
Bay Data Consultants
St. Petersburg, Fla.

Cisco probably has invested more money and devoted more resources to voice over IP than any other company. The problem is the various IP phone technologies do not interoperate. There also does not seem to be much momentum in the industry to standardize the technology.

At the recent Internet telephony conference in San Diego, I asked all the vendors about compatibility between different phones. The answers I got ranged from "we don't know" to "we are testing."

Randall Shimizu
San Diego

**More online!** www.nwfusion.com Find out what readers are saying about these and other topics. **DocFinder: 7023**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**YANKEE INGENUITY**

Tim Kraskey

# History repeating itself

It has been said that two things in life are constant: death and taxes. Well, there's another: history repeating itself. Specifically, we are in the midst of returning to private networks — again.

When the AT&T/Bell System broke up in 1984, companies began building private T-1 networks because the economics justified doing so. A company could connect offices in New York and Chicago and save a boatload of money. The cost justification was on the voice traffic, and data rode free.

Fast forward 10 years, and we start to see the shift to public networking, as companies began moving their voice networks to outsourced public VPN-based networks. If you've been in the business long enough, you may remember Tariff 12s — public network-based special tariffs for large users of voice-based VPNs. On the data front, the Internet became the public network. A company just needed a premises router connected to the giant carrier-based network of owned and hosted routers in the sky.

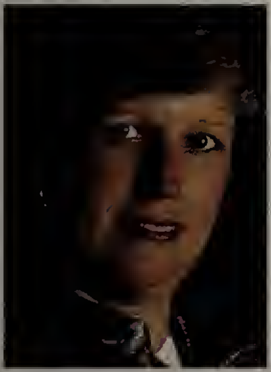
Fast forward a few more years to the Telecommunications Act of 1996, which was supposed to usher in local and intrastate long-distance competition for public-based networks. Competition could only happen if all carriers were on a level playing field. They weren't — the incumbents owned the local loop and thus had the advantage. The real or perceived threat of some sort of carrier-based competition, in the form of competitive local exchange carriers or ISPs, was short-lived. We moved to where voice services were pennies on the minute, data was virtually free to flow, and the limitation was the price you were willing to pay and the size of your access pipe.

Fast forward to today, and we see the flaws in the telecom act. First, it did not provide any real local competition in last-mile connectivity services. Second, it let incumbent local exchange carriers provide intrastate long-distance service, thus driving the price of a long-distance call so low that no one could make money or invest in next-generation technologies. Third, the act did not free up the wireless spectrum to provide any real alternative for last-mile delivery or open up the cable operators' networks. Instead, it let local exchange carriers and cable TV monopolies crush competition through the many legal and public utility commission channels.

Two constants are always present in monopolies: Price goes up, and service goes down. As regional monopolies take further hold through carrier consolidation, these two constants will become ever more apparent. In addition, carriers have done a poor job of adding new, enhanced services to their networks. As service levels degrade and price starts to creep up, the most demanding and innovative companies will start to build private networks — though these new networks will be built entirely on IP-based services for voice, data and video. History does repeat itself.

*Kraskey is managing director at YankeeTek Ventures, a Cambridge, Mass., incubator. He can be reached at tim@yankeetek.com.*

**We are in the midst of returning to private networks — again.**



**SPEAKING THE LANGUAGE**

Linda Musthaler

# Preserving our privacy

They started coming in the mail in the spring, first a trickle and then several per day. Privacy statements. From credit card companies, insurance companies, banks, financial planners. It seemed that anyone who had information about my personal health or wealth was telling me their policy on how it would safeguard my private information.

Or at least I thought it was private. I had to read the fine print to learn that, unless I took some specific action — usually returning some postcard or letter — my personal data could be shared with other companies "to provide better service" to me.

Web sites, too, can collect a lot of information about an individual. Sometimes the collection of information is very obvious, such as when you complete a purchase transaction or register to enter a portal for "members only." Sometimes the data collection takes place in the background, and you aren't even aware of it, such as with "click-through" ads that trace what other Web sites you've visited.

However, privacy is more than just a daunting issue for the computer user; it can be a real economic drag for companies wanting to conduct business over the Internet. In the recent report "CommerceNet 2000 Survey: Barriers to Electronic Commerce," computer users' concerns over "security and encryption" and "trust and risk" were cited as the top impediments to e-commerce growth.

If the IT industry could do more to gain users' confidence and trust in online privacy and security, ordinary people might feel better about the Internet for business and personal use.

That's the impetus for the Platform for Privacy Preferences Project (P3P), which the World Wide Web Consortium (W3C) is spearheading. P3P "is emerging as an industry standard providing a simple, automated way for users to gain more control over the use of personal information on Web sites they visit," the W3C says.

By answering a few standardized, multiple-choice questions, users develop their own policies on how they would accept online companies using their personal data. Each Web site deploying the P3P specification also has a policy of how it uses personal data. The P3P specification makes it easy to compare the user's policy with the Web site's policy, giving the user the choice of whether or not to enter the Web site and conduct business there. It puts control into the user's hands in a simple-to-execute, simple-to-understand fashion.

Of course, P3P has its critics, most of whom say the specification doesn't do enough to safeguard privacy. Perhaps not, but at least it's a start on a consistent approach to the problem. Learn more about P3P on the W3C's Web site at www.w3c.org/p3p/.

One thing is almost certain: If the IT industry doesn't figure out how to solve this issue itself, the federal government will step in to strengthen current privacy legislation. Congress has acknowledged being impatient about the industry's lack of progress toward protecting online privacy. At the very least, the Federal Trade Commission has said it will more strictly enforce existing privacy policies. That means we'll start seeing a crackdown on online companies that don't do enough to safeguard your personal information.

The strange thing is, since Sept. 11, "privacy" has a different definition as far as the government is concerned. On Oct. 26, President Bush signed the Patriot Act of 2001 into law. This new law gives federal authorities more leeway in monitoring Internet usage and expands the way data is shared among different agencies. Of course, the law is designed to target shadowy figures that are suspected of terrorist activities. But like the poor dolphins in tuna nets, law-abiding citizens may get caught up in such investigations and find their personal data compromised. However, this is the price we'll pay for homeland security.

I'd like to see more companies get behind the industry's attempt at self-regulation. P3P may not be perfect, but it's better than having some government agency's view of privacy policy forced upon us. Like all technology solutions, it may take a few version of the P3P specifications to meet everyone's needs. Now is the time to offer your input to this specification. As the saying goes: Speak now or forever hold your peace.

*Musthaler is vice president of Currid & Company, a Houston technology assessment firm. She can be reached at linda@currid.com.*

**Congress has acknowledged being impatient about the industry's lack of progress toward protecting online privacy.**

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SPECIAL REPORT

# Safety nets

Protecting your networks before disaster strikes

39 **Disaster recovery: Then and now**
Companies are looking beyond tape backups and hot sites, and toward "business continuity plans."

42 **Security takes center stage**
Doors that were usually left open prior to Sept. 11 at Precise Software in Dallas are now locked.

44 **How ready are the nation's networks?**
Service providers say their network readiness prevented widespread disruption Sept. 11...but they're still doing more.

48 **The terrorist network**
Al Qaeda has been suspected of using advanced steganography over the Internet along with couriers carrying messages across the desert.

51 **Planning for the worst: bring in the best**
Expert advice is available for drawing up disaster-recovery and business contingency plans.

53 **Spending shifts**
IT resources are being shifted to disaster recovery and security for 2002 budgets.

**More online!**

- How to start the disaster-recovery planning processes. DocFinder: 7044
- Disaster-recovery planning advice, DocFinder: 7045
- The latest disaster-recovery news: DocFinder: 7046

# Lehman Brothers' network s

## Investment giant doesn't miss a beat after IT headquarters is leveled in WTC attack.

■ BY SHARON GAUDIN

Moments after American Airlines Flight 11 slammed into the Tower One of the World Trade Center, Bob Schwartz, managing director and CTO of Lehman Brothers, looked out his 40th-floor window to see the roofs of nearby buildings on fire and pieces of his own building raining down. In the lobby outside his office, water was shooting out of the elevator banks.

Minutes later, Schwartz and his managers began moving their workers — the core of the global investment bank's IT staff — down the stairwell, away from the fire and chaos, as well as from the network that kept the company running.

As he made his way down the stairwell, the only thing Schwartz had with him to trigger Lehman's disaster plan and alert the company's CIO, working in London that day, was the BlackBerry pager in his jacket pocket.

"The BlackBerries let us e-mail back and forth, and our colleagues in the New Jersey office told us what was going on," says Schwartz, who made it out of the tower 30 minutes before it collapsed. "From the stairwell . . . we decided to trigger the disaster-recovery plan, open up a command center and put voice bridges in place for conference calls."

All but one of Lehman's 625 IS employees, who worked on floors 38 to 40 of Tower One, made it out alive.

And despite the devastation, Lehman's treasury department moved to the back-up recovery site — the day of the attack — and performed its cash-management functions. The day after the attack, the company was trading fixed-income products and had 400 traders online to handle equities when the New York Stock Exchange reopened the next Monday.

"The network was the hero," says Schwartz, who adds that all their preplanning and network buildup paid off. "No information was lost. I'm sure there were a couple little things here and there, but nothing that interfered with our ability to provide service to our customers."

### A network destroyed

Along with the human toll, Lehman suffered a devastating blow to its offices, computer network and infrastructure. Lehman's worldwide headquarters were in Manhattan, with offices in four buildings in the World Trade Center area. The IT department — application developers, engineering teams and the technology management team — was housed in Tower One, and Lehman also had people in three buildings in the World Financial Center next door.

All the desktops, servers and other hardware in Tower One are now rubble, and the other three buildings are unusable as well. In all, the company lost 5,000 desktops, an entire data center and all its networking gear.

Schwartz says the company has not put a figure on the losses the company suffered Sept. 11. But whatever it adds up to be, the financial hit would have been multiplied if the company's lifeblood, its information, had been lost.

"In the planning process, you can never guess what the disaster might be," Schwartz says. "It's always hard to picture what's going to work. We were cautiously optimistic we would be able to restore all the important applications on a timely basis."

### Preparing for disaster

"We had completely redundant networks on both sides of the river," Schwartz says, referring to his offices in Manhattan and the back-up site in Jersey City, N.J. "Every application that ran in New York also ran in New Jersey. All wide-area links were completely duplicated. We had two lines, one terminating in New York and one terminating in New Jersey. When we lost access to everything in New York, we still had access through New Jersey to all our other 45 branches."

Schwartz says Lehman also had two identical data centers, one in Manhattan and one in New Jersey, linked by fiber-optic cable running under the Hudson River. Backups were automatically performed — one center backing up the other — so each set of backups would be remotely stored from its original site.

"We were prepared for the loss of either one of those two data centers," Schwartz says. "When we were attacked, we were able to increase the amount of band-

# urvives

width . . . allowing us to keep all of our other offices up and running. They were able to continue their normal operations as if nothing had happened."

In the days after the attack, the disaster-recovery team began rebuilding the company's IT infrastructure. Vendors such as Compaq pitched in and quickly shipped the hardware and software Lehman needed. In the first three weeks, Compaq had shipped the company 2,500 PCs.

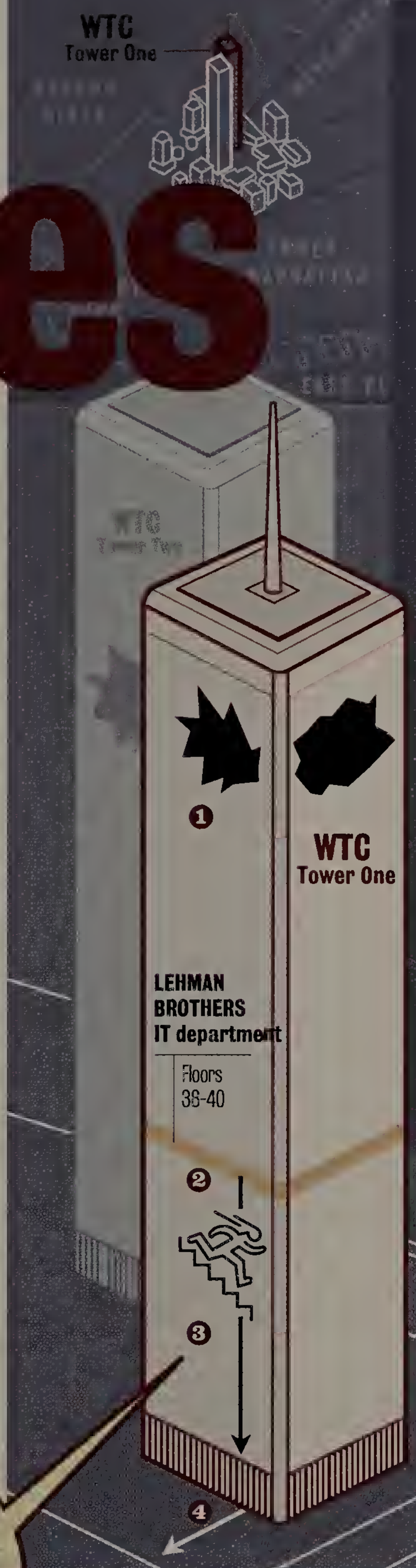
The disaster-recovery team created a trading facility in its former New Jersey data center.

It also worked out a deal with Sheraton Manhattan, taking over the hotel and removing beds and moving in desktops to give people a place to work. The hotel's ballroom became an IT hub with VPN connectivity to New Jersey.

"We were able to almost immediately seat the most critical people to get the business back up and running," says John Manville, manager of networks and telecommunications, and a senior vice president at Lehman Brothers.

Manville says the company is now running on a single data center and working on setting up another one so it can once again have needed redundancy. Today, it is relying somewhat on its London data center, taking advantage of its spare capacity over a wide-area network. "It's giving us a site to back up some of our more critical applications," Manville says.

And Lehman remains committed to keeping its operations in Manhattan. The company announced recently that it was purchasing a 1-million-square-foot office tower on Seventh Avenue to serve as its new headquarters. ■



## Disaster recovery on the run

### TUESDAY, SEPT. 11

**8:48 a.m.** American Airlines Flight 11 hits Tower One of the World Trade Center. ①

Minutes later, Lehman Brothers' CTO Bob Schwartz and his co-workers head down the stairwell. ②

**9:03 a.m.** United Airlines Flight 175 crashes into Tower Two of the World Trade Center.

Schwartz uses his BlackBerry to alert workers in New Jersey to fire up the disaster-recovery plan while he continues down the stairwell to escape the building. ③

Schwartz uses his BlackBerry to update Lehman's CIO, who was in London.

Lehman's disaster plan goes into effect and the command center was opened in New Jersey while Tower One was still being evacuated.

**9:40 a.m.** Trading on Wall Street was called off.

**9:45 a.m.** Schwartz makes his way out of the building. ④

**9:50 a.m.** Tower Two collapses.

**10:29 a.m.** Tower One collapses.

Later in the day, Lehman's treasury department moves into its back-up recovery site in New Jersey and perform its cash-management functions.

### WEDNESDAY, SEPT. 12

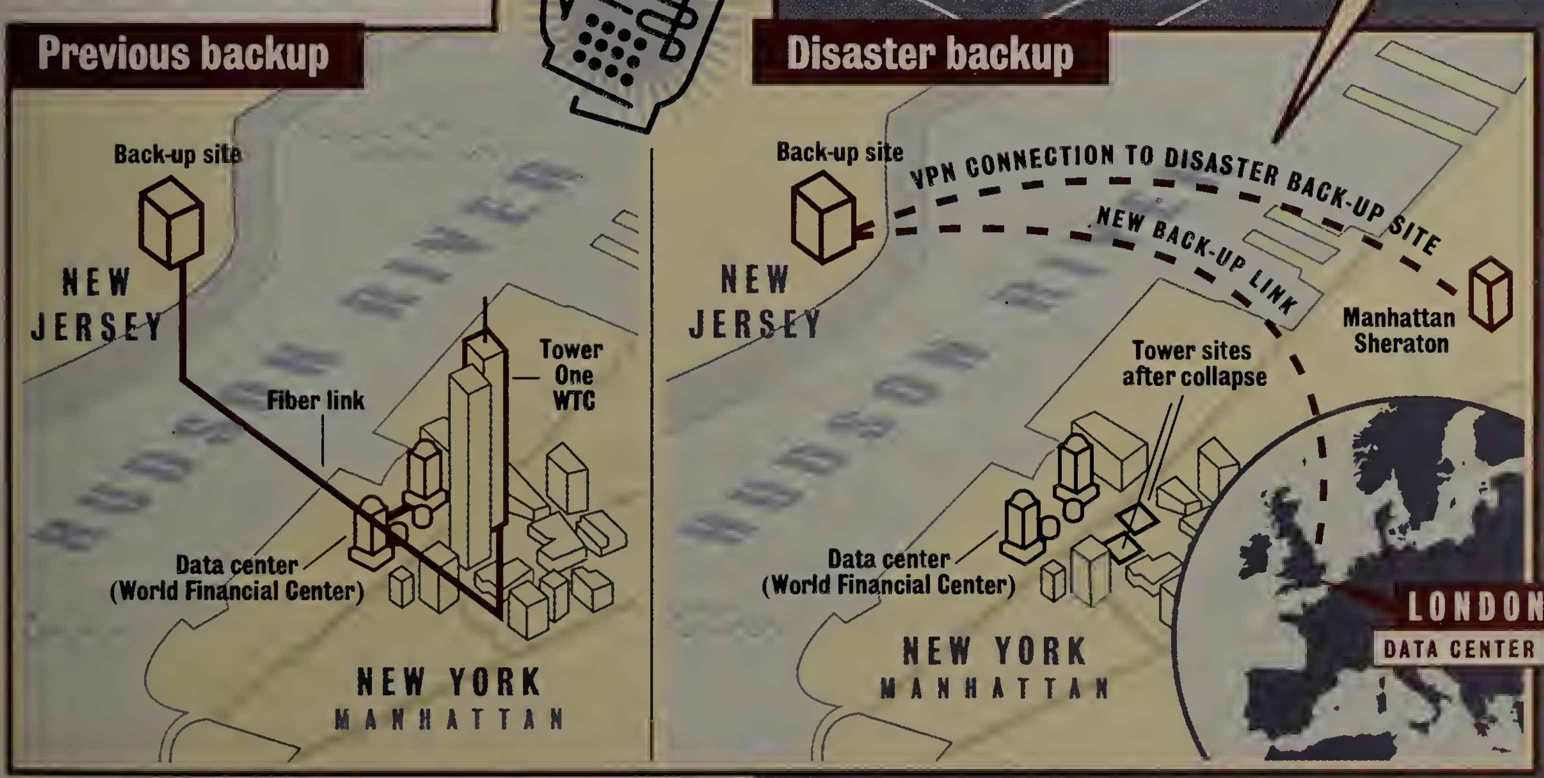
Lehman's fixed-income trading was up and running.

### MONDAY, SEPT. 17

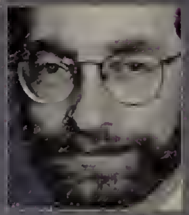
Lehman was back trading equities when the New York Stock Exchange reopened.

## "The network was the hero"

Lehman Brothers' CTO Bob Schwartz largely credits the redundancies in the network for keeping the company running after the terrorist attacks. The company's 5,000 desktops in Manhattan were spread out through four sites — one in the World Trade Center and three in the World Financial Center next door. A site in Jersey City, N.J. mirrored the Manhattan network and backed it up. After the attack, the New Jersey site served as disaster-recovery headquarters, as well as a trading facility. Lehman took over the Sheraton Manhattan, turning bedrooms into offices and using the ballroom as an IT hub with VPN connectivity to New Jersey. The company also used its London data center to back up some of its more critical applications.



## Surviving the stairwell

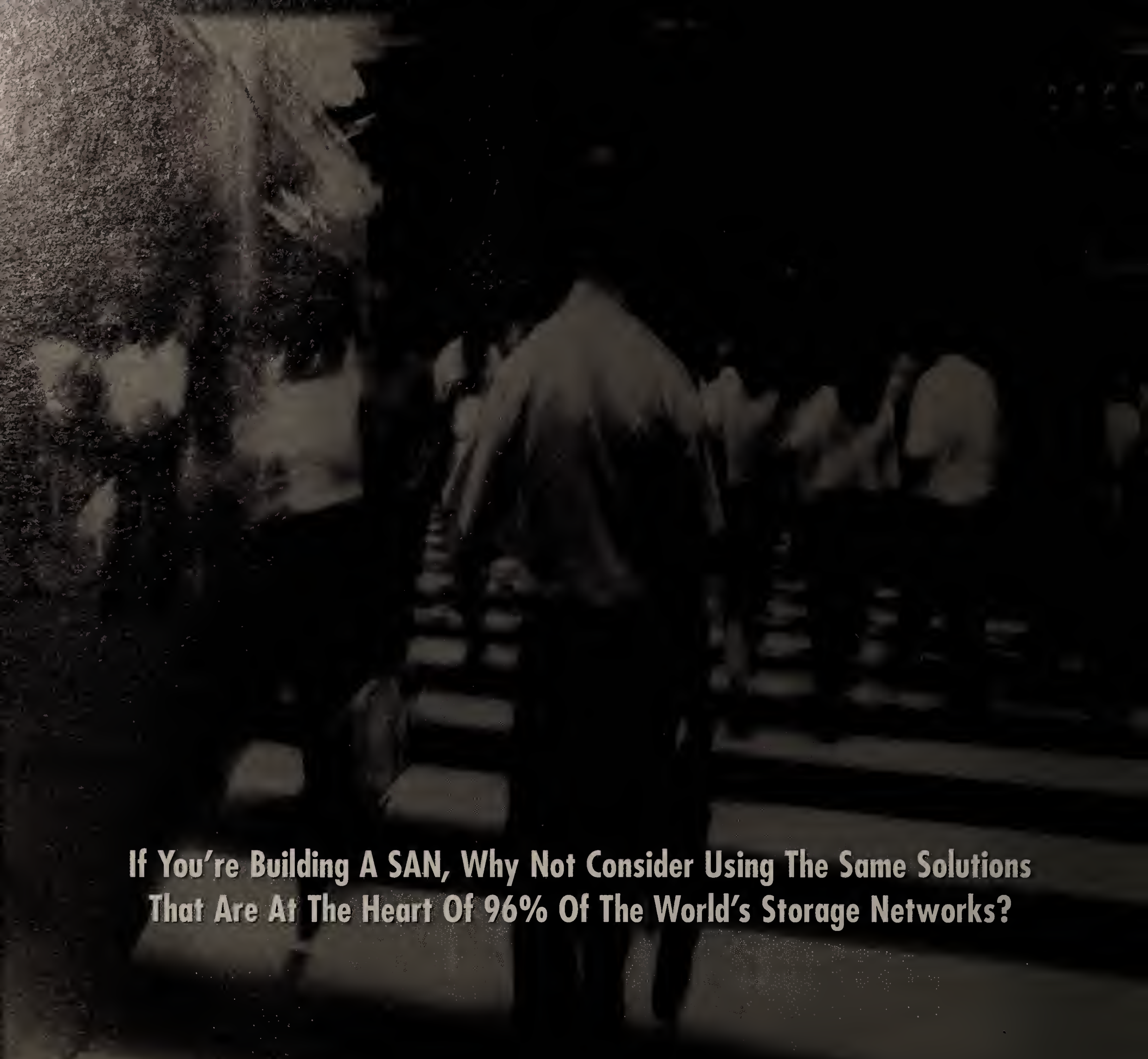


Lehman Brothers' CTO Bob Schwartz

Less than an hour before Tower One of the World Trade Center collapsed, Bob Schwartz thought he was out of danger as he worked his way down the stairwell from his office on the 40th floor.

"I felt once we were in the stairwell, we were safe," says Schwartz, Lehman's CTO, who said the thousands of people escaping down the stairwell alternately pushed and jammed, slowing their descent to a crawl at times. "Nothing is going to happen to the building, I thought. We had survived the big bomb eight or nine years ago. Not in my wildest dreams did I think the building would come down."

John Manville, Lehman's manager of networks and telecommunications, says if they had known the tower was about to collapse, there would have been more panic in the stairwell and fewer people would have escaped in the confusion. "In one sense, it was fortunate, we didn't realize how much danger we were in," he says.



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# Disaster recovery then and now

■ BY JOHN FONTANA AND DENI CONNOR

From his office in lower Manhattan, Alen Teplitsky has a clear view of where the World Trade Center towers once stretched into the sky. Today, with the buildings in rubble, he sees a constant reminder of a new world.

Teplitsky won't ever forget the human loss and property destruction from that tragic day in September, but as he moves forward he continues to ask himself: Could our company recover from such a direct attack?

"We had a straight-on view of the World Trade Center, and you have to know now that anything can happen. We're taking that very seriously," says Teplitsky, a network administrator for a phone company that serves the Northeast.

Teplitsky says it's not only the loss of systems, but also the loss of the building that houses those systems and the people who run them.

"Before, if we planned that our whole data center would be destroyed people would have said we were crazy," he says. "But that's what we are doing now."

It's the same "crazy" notion that so many network executives are now thinking about and acting on.

## More than backup and recovery

The conclusion many are coming to is that disaster recovery includes a lot more than the type of backup and recovery that involves tapes and hot sites. They're realizing disaster recovery is only part of what should be a companywide business continuity plan.

Gartner estimates that 85% of large organizations have some sort of disaster-recovery plan, but that only 25% of them have a broader business-recovery plan, and only 10% to 15% of those are up-to-date.

"This tragedy has awakened boards of directors and CIOs to business continuity planning," says Donna Scott, an analyst for Gartner. "The thought process is to expand the planning for loss of life and destruction of property. Every company was unprepared for that."

John Glenn, a certified business continuity planner, agrees there has been an awakening.

"What corporations typically have done is focus on IT at the expense of the rest of the business," he says.

Glenn says business continuity planning is a three-step process:

- Conduct an analysis that defines an organization's critical business functions, identifies and prioritizes risks (such as natural disasters or terrorist attacks) to those functions, and establishes policies to avoid or mitigate those risks.
- Devise a disaster-recovery plan for critical systems and data, including: establishing primary and alternate recovery teams; setting up notification procedures such as call trees; determining primary and alternate meeting sites; tracking inventories of software and hardware; having readily accessible contact information for vendors; and clearly defining back-up and recovery techniques.
- Set up intervals of training and testing for the disaster-recovery team and the business continuity plan as a way to make revisions and stay confident the plan is battle tested.

### Survival plan

**Consultant John Glenn says corporations should go through a series of basic steps to get rolling on the creation of a business continuity plan:**

- Identify key business units, the functions they perform and how critical they are to the overall business.
- Specify tools — such as office and production wares, workstations and communication products — needed to perform business unit functions. Identify suppliers.
- Pinpoint risks — man-made, natural or technological — to business unit functions.
- Develop risk/avoidance and mitigation recommendations, and rate them by effectiveness.
- Create a disaster-recovery team with a reporting structure based on a hierarchy, and define team members by assignment.
- Specify a procedure for declaring disasters that have some forewarning (such as a hurricane) and those that do not.
- Create a non-employee notification list, including vendors, and government and regulatory agencies.
- Devise a disaster team training methodology and planning schedule.
- Have a plan that includes a schedule for routine maintenance and a list of "triggers" for maintenance reviews (such as an upgrade to desktop operating systems).

Some may see such extensive planning as merely a fire drill in the wake of tragedy, but history bears out the importance of a business continuity plan. Consider Hurricane Andrew, which struck in 1992 and is the worst natural disaster on record. Within two years, 80% of the affected companies that lacked a business continuity plan had failed, according to the Federal Emergency Management Agency.

The events of Sept. 11 have shown companies just how narrow their planning may have been.

"People were not taken into account. Are people still alive? Do they have the mental capacity to work?" says Rich Corcoran, business recovery information manager for Eastman Kodak and one of the most respected IT executives in the continuity-planning field. He has spent 15 years crafting Kodak's continuity plan.

Corcoran says other planning deficiencies were workstation recovery and detailed plans to store and recover vital records, such as those on microfilm or digitized.

Kodak's plan ensures 100 fully functional workstations are available in 24 hours and 300 within three days. And the recovery time for Kodak's enterprise resource planning (ERP) application is four hours for basic availability and 30 hours for total restore. "That is an extremely aggressive ... plan," he says.

Tom Kelly, senior director of customer services for SunGard, a leading business continuity services firm, says a major deficiency he saw was in the scope of planning. "We've been having a lot of discussions with clients on business dependencies," he says. "Many hadn't thought that through. Peripherals, such as printers, were commonly overlooked."

## Setting a new course

Zamba Solutions, a consulting firm, had basic contingency plans such as telephone lists, vendor contact numbers and data backup, but now all that is under review as the company develops a formal written plan.

"The organization as a whole now recognizes that some sort of plan has to be in place. We have a lot of visibility with upper management," says Tom Booth, director of IT. "The work is less on disaster recovery right now and more on business continuity planning."

Booth is helping define 10 to 12 of Zamba's core business processes, such as payroll and benefits coordination, and the internal and external dependencies on those processes that are key to sustaining the business during an emergency.

"It's an eye-opening experience just to do the dependencies for payroll to figure out all that is needed to get that up and running again," he says.

He says the biggest realization is "that this is more than a systems problem."

That realization happened in June for Rich Obrecht, the IT representative for the disaster-recovery team at a leading oil and gas company in Texas, when Tropical Storm Allison paralyzed Houston.

We've started to form disaster-recovery teams by business unit," Obrecht says. "We've had fairly lengthy interviews with the business unit people to discuss what they need when an emergency hits, when you don't have an office and you've lost paperwork."

The questions are "Where is my engineer, my accountant? How will they get data, tools, mail? We are just realizing how big this animal is," he says.

Pat Parker, director of data systems for CBS Marketwatch.com, says the notion of property loss is changing how the news organization inputs and replicates data between three data centers in New York, Minneapolis and Redwood, Calif.

"The data for our live tickers use to flow into one data center. Now it flows into all three," Parker says.

He says the company's focus is to get everything in writing and form a cohesive back-up and recovery plan that is identical at every data center. "And now we are considering network switching, data routing, replicating domain controllers, equipment needs, electricity and efficient means to restore backup," Parker says. The plan is expected to take six months to complete.

Experts say disaster-recovery plans should evaluate the need for, or the configuration of, replication, redundancy clusters, software change management, remote access, access to back-up tapes or servers, and hot or cold sites. Companies also should establish "quick ship" programs from vendors for product replacement.

Plans also should include remote management in case of biological attack.

"If your site is evacuated, can you manage from a remote site if you can't get to your servers? That takes planning to assure, for instance, that your servers can be booted remotely," Gartner's Scott says.

## Testing, testing

Kodak's Corcoran says that without testing you don't have a plan. "At a minimum you have to test once a year for critical applications and infrastructure. Our ERP recovery plan is tested three times a year," he says.

Corcoran says testing must be conducted only in a plan's established recovery center. "That sticky note on the server is of no help at that point," he says.

Chris Leach, national director of technology risk management for Grant Thornton, a global accounting firm, agrees that it is all about testing. "It's sobering when you run your first test and see what you missed. I have never seen a test that did not involve surprises," he says.

He says companies are now asking if backup is enough and if they are doing it right. "We ask them in response, 'Can you pull out your IT department and have it run somewhere else?'" he says.

## Cost vs. risk

However, the extent of many organizations' recovery plans eventually will boil down to costs, which can be hard to determine.

Experts say spending can start at $20,000 and go through the roof from there.

Corcoran says cost is hard to quantify because effective continuity planning has to be second nature.

"Any good corporate business continuity plan should be part of the culture," he says. "When you do something in the corporation you have to ask what it changes, if it increases risks. Continuity planning has to be part of the business process model."

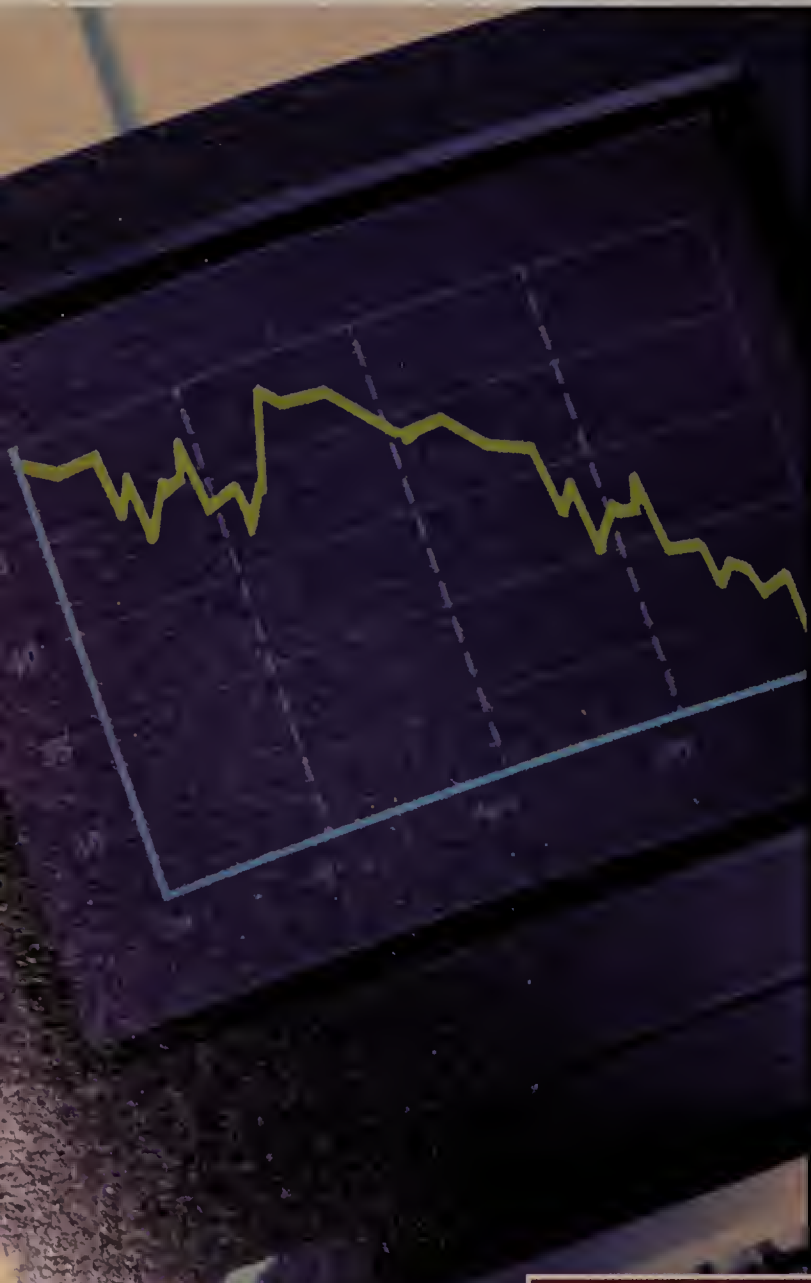
But Gartner's Scott says there are low-cost steps that can be taken immediately.

"You can put together a crisis management team that puts flashlights in desks, [and] maintains call lists of personal phone numbers and e-mail addresses," she says.

Teplitsky, the network administrator at the Northeast telephone company who views those costs against the backdrop that use to feature the World Trade Center towers, says his company is considering spending $400,000 just to install redundant storage that would replicate data daily.

Overall, he estimates the company could spend more than $1 million just to ensure up-to-the-day data restoration. And that figure doesn't take into account ongoing maintenance and testing or other parts of the continuity plan.

However, it is those kinds of figures corporate executives will wrestle with in trying to determine how much risk they can endure. ■



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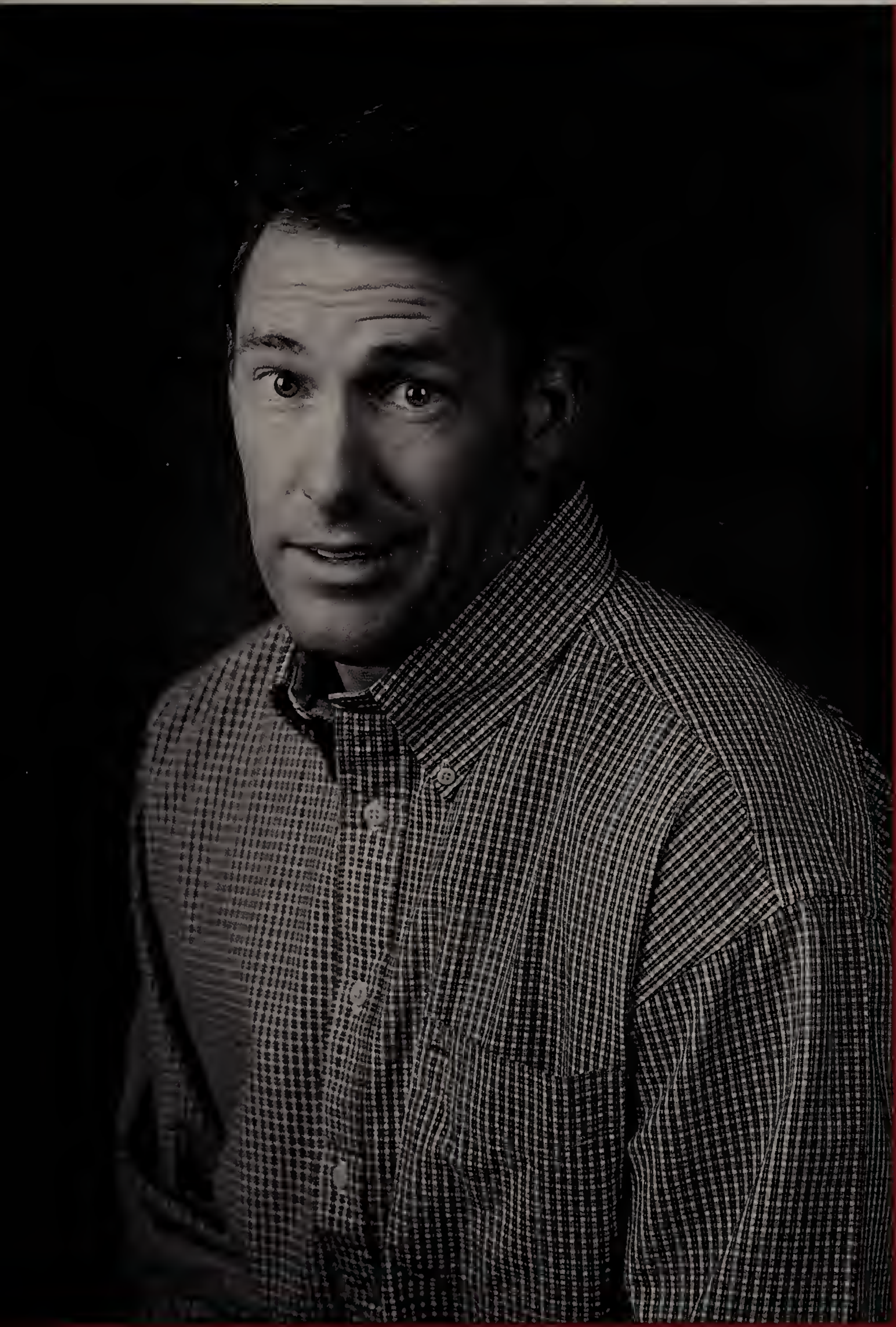

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# Security takes center stage

## Companies put more emphasis on security after Sept. 11 attacks.

■ BY SHARON GAUDIN

Doors that were usually left open before Sept. 11 at Precise Software in Dallas are now locked. Workers are quick to report anything suspicious — either in the building itself or online. And when something is reported, the company is a lot quicker to respond.

Precise Software may not have doubled its security budget or locked down its network since terrorist attacks ripped into the World Trade Center, but employees are on a heightened state of alert.

"I guess we have added to the security staff," says Kurt Ziegler, executive vice president of the $50 million performance software company. "Now, everyone is on the security staff. Now everyone is involved, and that's good."

Corporate users and industry watchers say IT executives are well aware of the threat from conventional and cyber terrorism. The Sept. 11 attacks, and the devastation that so many companies faced, sent IT staffs across the country running to double-check their back-up tapes and put in nervous calls to their hot-swap sites.

What Sept. 11 fears haven't done, at least yet, is cause CEOs and executive committees to recalculate and expand their security budgets. In this time of economic belt-tightening, even the fear of a corporate attack hasn't made extra monies flow.

On the other hand, security budgets are being kept intact while other areas are being cut.

"SECURITY NOW IS A STRATEGIC ISSUE RATHER THAN A TACTICAL ISSUE. WOE IS THE CEO WHO HASN'T TAKEN THE MEASURES TO PROTECT THE COMPANY."

ELAD YORAN,
EXECUTIVE VICE PRESIDENT, RIPTECH

In many cases, enhanced security already was in the works. And users interviewed say there's no plans to curtail those expenditures.

"What we're seeing is that security accountability has shifted from the IS staff to the CEO," says Elad Yoran, executive vice president of RipTech, a network security firm in Alexandria, Va.

"Security now is a strategic issue rather than a tactical issue. Woe is the CEO who hasn't taken the measures to protect the company," he adds.

Yoran says client calls dropped to nearly nothing in the two weeks after Sept. 11 and then immediately spiked back up early in October to rates much higher than before the attacks.

Dave Jarrell, computer security officer at the Federal Communications Commission in Washington, D.C., says the terrorist attacks forced the agency to be more vigilant, both in monitoring its network and in keeping upper management informed about their efforts.

"We've always been very aggressive about system monitoring and having a proactive approach to computer security," says Jarrell, who monitors the perimeter of the network and traffic on the inside. "We're just a little bit more aware of what's going on.... The entire population that focuses on security, whether cyber or physical, is more concerned about their programs."

And Jarrell says he used to report on security issues to his bosses as they occurred but now he makes weekly reports regardless of what is happening on the system.

"They have the assurance that on the cyber side of the house, everything is more attended to," Jarrell says. "There's more communication. It's more fluid now.... If nothing has happened, I let them know that so they have peace of mind."

That peace of mind — or lack of it, actually — is most of the problem, according to some analysts and users.

Most major companies have been aware for years of the potential of a large-scale, coordinated attack on corporate America. But now those concerns, which were in the back of people's minds, are in the forefront of their security thoughts ... and those fears come with visuals, thanks to the images of the attacks that were played repeatedly on 24-hour news stations.

"There's more of an awareness of what could happen," says David Smith, network manager of C&S Wholesale Grocers, a $9 billion company in Brattleboro, Vt. "It's that knowledge of one's mortality.... It makes it all seem more critical."

That feeling of vulnerability — both at home and in the workplace — has users testing the security measures they've already had in place, according to Daniel Woolley, COO of NetSec, a security company in Herndon, Va. Woolley says NetSec has seen a three- to fourfold increase in customers asking for vulnerability assessments. And he says for the first time, nearly every client calling in wants to know if NetSec's people have gone through security checks.

"THERE'S MORE OF AN AWARENESS OF WHAT COULD HAPPEN. IT'S THAT KNOWLEDGE OF ONE'S MORTALITY ... IT MAKES IT ALL SEEM MORE CRITICAL."

DAVID SMITH, NETWORK MANAGER, C&S WHOLESALE GROCERS

At First American Bank in Illinois, a $1.6 billion financial institution with 32 branches, checking its own security strategy in light of the Sept. 11 attacks means creating a plan to split up the company's IT team.

"Since Sept. 11, the issue of the geographical dispersion of our staff really heightened," says Noel Levasseur, executive vice president of IT at First American Bank. "All of our IT department is in one location. If we had something catastrophic ... we might have systems running but no one to run them."

Levasseur says he now needs to figure out how to split up his IT team, whose members are used to working together. "I don't think it makes it more difficult to work but it makes the management challenging and the teamwork challenging," he says. "You can't always leave someone at a remote location. You need to rotate it."

Ziegler of Precise Software says it's important to make sure that changes in security strategy are changes with which workers can live — and work.

"People are much more amenable to security," Ziegler says.

"Before, it was a bother. Now they see the need. When someone puts rules in place, they're not complaining about it.... This is a good thing. It hasn't affected business. It's not intrusive and offensive," he adds. ■

"THE ISSUE OF THE GEOGRAPHICAL DISPERSION OF OUR STAFF REALLY HEIGHTENED. ALL OF OUR IT DEPARTMENT IS IN ONE LOCATION. IF WE HAD SOMETHING CATASTROPHIC ... WE MIGHT HAVE SYSTEMS RUNNING BUT NO ONE TO RUN THEM."

NOEL LEVASSEUR, EXECUTIVE VICE PRESIDENT OF IT, FIRST AMERICAN BANK

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# How ready are the nation's networks?

**BY DENISE PAPPALARDO AND CAROLYN DUFFY MARSAN**

Disaster preparedness isn't new for carriers and ISPs, which have had to guard against earthquakes, floods and hurricanes since networks began crisscrossing the country.

But no one had planned — at least not fully — for the disaster that hit the U.S. on Sept. 11.

Most national network service providers were affected when terrorists attacked the U.S. Most claim their network readiness prevented a national tragedy from also becoming a technical catastrophe. However, a heightened vigilance has emerged in the two months since.

Experts agree that the Internet performed better than the circuit-switched telephone network during the attacks, but that's because the two networks are designed differently.

The U.S. military designed the Internet to route around structural problems like those occurring in Verizon's main switching facility in New York.

But when an entire central office switch site that serves thousands of customers is annihilated, it takes time to reroute calls to a different switching facility.

Verizon's West Street central office switch facility, which sits directly across from where World Trade Center Building 7 stood, was severely damaged. This site, which connected 200,000 voice lines and 3 million specialized private data lines, was pretty much out of commission. But with engineers at Ground Zero, Verizon had back-up switches and power supplies on the sidewalks in front of its West Street facility to get customers back online.

An unknown number of users were knocked off the Internet because several ISPs had points of presence in the World Trade Center. However, the Internet's distributed nature let most users maintain access.

Genuity lost a POP in the World Trade Center. While it took time for the ISP to get customers back online, Genuity says it couldn't have done it without the help of Verizon.

ISP dependency on local networks is considered a vulnerability of the Internet, but it's a necessary evil.

Users who accessed Genuity's POP in the World Trade Center were looking to reconnect to the Internet from different sites around New York City and elsewhere. Genuity brought all of its customers back online in a matter of days, says Chris Yetman, vice president of technical support at the ISP.

While all of the service providers interviewed for this story had disaster-recovery and redundancy plans built into their operations before Sept. 11, all agree there is room for improvement.

This event triggered Genuity to examine its data centers and POP locations to ensure these facilities have broadband connectivity that guarantees redundancy.

"In the past we would allow a data center to be homed to the same POP on our backbone if it made the most sense from a network efficiency perspective," Yetman says. "We didn't think it affected redundancy because we weren't thinking about losing a whole data center. We thought about routers going offline or a backhoe chewing up a fiber line."

"…WE WOULD ALLOW A DATA CENTER TO BE HOMED TO THE SAME POP ON OUR BACKBONE IF IT MADE THE MOST SENSE FROM A NETWORK EFFICIENCY PERSPECTIVE. WE DIDN'T THINK IT AFFECTED REDUNDANCY BECAUSE WE WEREN'T THINKING ABOUT LOSING A WHOLE DATA CENTER."

CHRIS YETMAN, VICE PRESIDENT OF TECHNICAL SUPPORT, GENUITY

"It didn't take much to map things differently," he says.

Genuity redirected OC-48 connections from its data centers and POPs to different routers on its network for redundancy's sake. If Genuity lost a facility to a bombing today, traffic would be automatically rerouted.

Genuity has also taken steps to ensure that "certain high-profile customers such as government agencies" are easily and quickly identified and serviced in the case of an emergency. These government customers typically need additional circuits when a disaster strikes, but Genuity also has to ensure circuits aren't taken away from emergency relief efforts at hospitals or Red Cross facilities. Genuity has developed a plan to better locate and contact these customers when disaster strikes, a plan it did not have previously in place.

And while the ISP's network operations center (NOC) — essentially the heart of Genuity's backbone — has a back-up facility that could replicate all monitoring, this site is only 12 miles away. The main NOC is in Woburn, Mass., and the backup is in nearby Burlington, Mass. The ISP also has a back-up facility in Columbia, Md., but this site is not as robust as the one in Burlington.

"We're aware of how close they are, and we're examining ways to lessen that vulnerability," Yetman says.

While redundant ISP networks play a key role in the reliability of the Internet, the fact that this is a network based on hundreds of private and public traffic exchange points is also a key element of its resiliency. The 'Net was designed to withstand outages.

In the late 1990s there were stories written about how vulnerable WorldCom's Metropolitan Area Exchange (MAE) East was because it was housed in the basement of a parking garage. However, even if MAE East were knocked out, the Internet would survive, although users would likely notice a slowdown.

Neither WorldCom nor Sprint, which also operates an Internet network access point in New Jersey, would grant interviews for this story, citing security concerns.

But other providers that operate exchange points on the Internet talked about how operations were affected by the events of Sept. 11.

"We have facilities in New York. The one that was close to Ground Zero suffered some struggles such as power failures as well as carrier failures," says Ali Marashi, vice president of technical services at InterNap, which operates 37 "global service point" exchanges. "But we had another facility, which kept kicking right along.

"The recent tragedy shows that even the best systems can have some weaknesses," he says. "It's a wake-up call to operations centers to better ensure that their back-up plans work as advertised."

Equinix, which operates six exchanges on the Internet, says it hasn't had to make changes to its physical environment or operational procedures since Sept. 11 because security was already high.

"What has changed since Sept. 11 is that customers are focusing on three areas: geographic diversity, network diversity and contractual diversity," says Jay Adelson, CTO and founder at Equinix. "Our customers are

See Readiness, page 46

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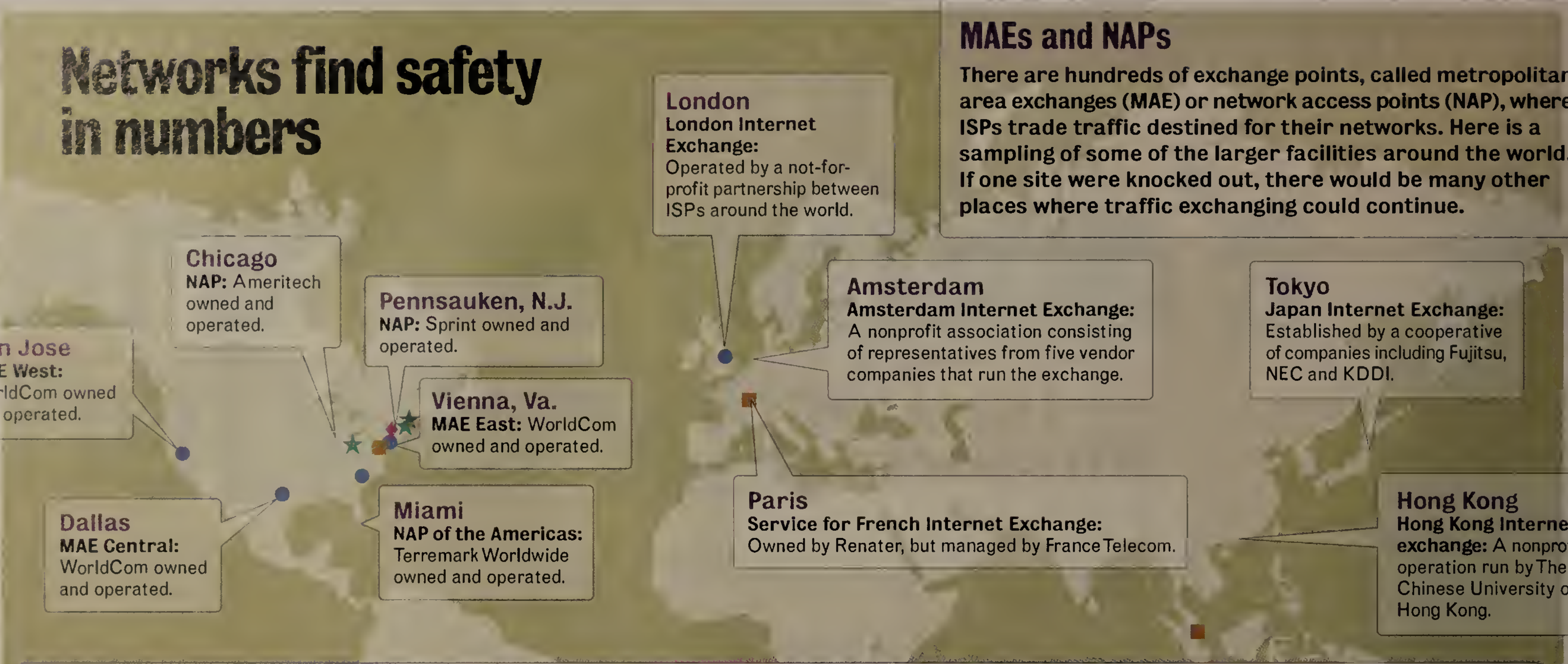
# Networks find safety in numbers

## MAEs and NAPs

**There are hundreds of exchange points, called metropolitan area exchanges (MAE) or network access points (NAP), where ISPs trade traffic destined for their networks. Here is a sampling of some of the larger facilities around the world. If one site were knocked out, there would be many other places where traffic exchanging could continue.**



**San Jose**
**MAE West:** WorldCom owned and operated.

**Chicago**
**NAP:** Ameritech owned and operated.

**Pennsauken, N.J.**
**NAP:** Sprint owned and operated.

**Vienna, Va.**
**MAE East:** WorldCom owned and operated.

**Dallas**
**MAE Central:** WorldCom owned and operated.

**Miami**
**NAP of the Americas:** Terremark Worldwide owned and operated.

**London**
**London Internet Exchange:** Operated by a not-for-profit partnership between ISPs around the world.

**Amsterdam**
**Amsterdam Internet Exchange:** A nonprofit association consisting of representatives from five vendor companies that run the exchange.

**Paris**
**Service for French Internet Exchange:** Owned by Renater, but managed by France Telecom.

**Tokyo**
**Japan Internet Exchange:** Established by a cooperative of companies including Fujitsu, NEC and KDDI.

**Hong Kong**
**Hong Kong Internet exchange:** A nonprofit operation run by The Chinese University of Hong Kong.

## Network reliability begins with the NOC

**As service providers establish their own fully redundant back-up network operations centers (NOC), it's possible to see how the Internet is not as vulnerable as some think. The Internet consists of thousands of ISP networks with hundreds of public peering points. If one goes down, others pick up the slack.**

◆ **AT&T** has a massive NOC in Bedminster, N.J., where it can monitor and manage its voice, data and Internet networks. The site operates under stringent security guidelines. AT&T has a fully redundant NOC somewhere in the U.S., but has never revealed its location for security reasons.

■ **Equant,** an international service provider operates three NOCs around the world. Each site can monitor and manage traffic on any of the provider's networks and are fully redundant. The sites are in Paris, Reston, Va., and Singapore.

● **WorldCom** has NOCs around the U.S. and in London. Here's a list of some of its sites based on a previous interview, as the company would not talk about such locations for this story:

- Ashburn, Va.
- Dallas
- Cary, N.C.
- London
- Sacramento, Calif.

★ **Genuity,** one of the largest national ISPs, operates a NOC in Woburn, Mass. Its backup is nearby in Burlington, Mass., with a smaller facility in Columbia, Md., that can mimic some of the operations of the Woburn facility.

## Readiness

Continued from page 44

really getting deep into their understanding of how networks are actually built so they can find out if Network A and Network B are actually riding on the same glass."

International service provider Equant understands the need for geographic diversity. Equant, which offers voice, data and Internet services around the world, has five NOCs, but it's in the process of consolidating those locations into three since its merger with Global One. Equant will maintain three NOCs, in Reston, Va., Paris and Singapore. While these NOCs run regional network monitoring, they each have the capability of running full backup for the other.

"Any other NOC can watch the other, which is part of the reason the locations follow the sun," says Jack Norris, director of customer service at Equant.

Equant has learned new lessons about network reliability since Sept. 11. The service provider lost connectivity to Canada after the attacks.

"One of the circuits we purchased to be diverse was routed through Wall Street," Norris says. That was a surprise because the circuit was to connect New York's Long Island to Toronto and Montreal.

"We didn't expect that particular facility would be in a different borough, and we didn't expect it to go through lower Manhattan. If we knew, we would have asked for a change," Norris says.

Equant has reexamined local connectivity for its networks. The service provider is committed to running more frequent audits to be sure local connectivity is in the best location.

Equant has also stepped up physical security at its NOCs and offices.

"There have been more advisories about travel to different countries, information about suspicious packages and building security," Norris says. Instead of leaving the front doors open with a security guard, Equant now has employees "badge in" at security boxes outside all doors.

AT&T also has beefed up security at its NOC in Bedminster, N.J.

"I was able to drive up to the gate and put my ID on a sensor and gain access to the grounds. Now I have to physically be let into the building," says Art Deacon, vice president of network operations.

AT&T has one back-up NOC, but says it has never publicly revealed this location. In addition to a fully redundant NOC, each network has its own operations center, Deacon says. Frame relay, ATM, private line, IP and voice each has its own mini-NOC.

Deacon says that on Sept. 11, AT&T's voice network performed exactly as it should by handling 431 million calls, considerably more than the typical volume of 330 million calls.

But because AT&T shared space at Verizon's West Street facility in lower Manhattan, it needed to deploy its disaster-recovery team to the site.

AT&T had its switching node, which is essentially a mobile central office voice switch deployed on two tractor trailers, in New York within 48 hours.

AT&T's typical disaster-recovery plan calls for engineers to fly into the disaster site from parts of the country that were not affected. That was more challenging in this case because flying was not an option. Deacon says staffers drove to New York from as far away as Jacksonville, Fla. Engineers manned the mobile facility, working 12-hour shifts, for six weeks.

"We spent $300 million to have the ability to recover a switching facility," he says. "We have tractor trailers in four different geographic areas in the country that can be accessed from any point within the contingent U.S. within 24 hours," he says.

Verizon, which suffered the bigger blow after the attacks, is making progress. The core of Verizon's network in downtown New York will end up in better shape than before the attack because many components are being upgraded. Asynchronous technology is being replaced by SONET. And many buildings, which formerly had copper connections, will now have fiber.

There also won't be as much reliance on the company's damaged West Street central office.

"We've had to increase the infrastructure in the other central offices with West Street down, and they will continue to take a heavier load in the future," says John Bell, senior vice president of network operations at Verizon.

Details of preparing for another catastrophe will differ from one carrier to the next, but the foundation of all plans appears to be common, experts say.

"One assumption that has absolutely changed," Equinix's Adelson says, "is the notion that you can build a data center so well that it can withstand anything."

*Senior Writer Michael Martin contributed to this story.*

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# The terrorist

Chechen leader Dzokhar Dudayev knew he needed to limit the time he spent using the satellite phone given to him by his Islamic allies in Turkey. It was the spring of 1996, and the survivor of two Russian assassination attempts was wary of Russia's ability to home in on his communication signal — and his location.

But on the evening of April 21, Dudayev, baited by Russian President Boris Yeltsin's offer of peace talks, called an adviser in Moscow to discuss the impending negotiations.

This time, Dudayev stayed on the phone too long.

American spy satellites, trained on Iraq and Kuwait, were quickly turned north to the Caucasus mountains and Chechnya, according to a former communications specialist with the U.S. National Security Agency (NSA). The satellites pinpointed the Chechen leader's location to within meters of his satellite phone signal, and the coordinates were sent to a Russian Sukhoi Su-25 fighter jet.

Dudayev was killed by two laser-guided air-to-surface missiles while still holding the phone that gave him away.

This deadly lesson, which the U.S. has never officially confirmed, was not lost on Osama bin Laden, a purported Chechen ally who fed money and weapons to their fight against the Russians. That lesson was complete when bin Laden subsequently received word that U.S. spy satellites, perhaps the very same that located Dudayev, had eavesdropped on his own satellite phone conversations. And members of the NSA played the tapes for visitors.

"Bin Laden knows what has happened and he's a smart man," says Wayne Madsen, a security consultant and former communications specialist with the U.S. Navy and the NSA. "He's learned his lesson… and he knows technology is a double-edged sword so he's using it carefully."

Today bin Laden is believed to school his soldiers in high-tech tools of communication. E-mail, online dead drops, satellite phones, cell phones, encryption and digital camouflage called steganography (see story, next page) are all tools of Al Qaeda, bin Laden's terrorist network. Those high-tech tools enable members of Al Qaeda to communicate with terrorist cells (or groups) hidden around the world.

But bin Laden himself uses none of it.

Instead, he has fallen back on ancient methods of communication, denying the U.S. and its allies the chance to track electronic footprints, satellite signals or even the radiation emissions from cellular phones. A grid of trusted human couriers, foot soldiers melding in with civilians, crisscross Afghanistan and flow into neighboring countries carrying written and whispered messages that are then electronically shot around the world.

"It's a hybrid organization," says Frank Cilluffo, chairman of the Committee on Combating Terrorism with the Center for Strategic and International Studies. "We're talking very high tech and we're talking rudimentary…. Messages are given to couriers who go to Pakistan or Iran or Iraq or London and they send out the messages from there. It makes law enforcement and intelligence questions very difficult."

So difficult that U.S. forces have not yet ferreted bin Laden and some of his lieutenants out of hiding. Security analysts and former military personnel say the top members of Al Qaeda, who are well educated and skilled, know where high-tech tools will help the cause and paranoid enough to distance themselves personally.

"We haven't taken any action [against bin Laden] yet and that means we haven't been able to locate him," says Marc Enger, executive vice president for Digital Defense, and a former colonel in the U.S. Air Force and director of operations for the Air Intelligence Agency. "If we had an electronic footprint of where he was, we'd be there giving him a wake-up call, so to speak."

## Out of the cave

The fact that a group of militant religious radicals, who largely are hiding in caves in a land ravaged by 20 years of war and a four-year drought, have access to, let alone expertise in, state-of-the-art communication tools doesn't surprise security analysts and former U.S. and Israeli military officials.

Members of Al Qaeda are not limited, experts add, by Afghanistan's rudimentary telecommunications infrastructure that only supports about 30,000 landlines in the whole country — most of them in the cities of Kabul and Kandahar.

Terrorist organizations worldwide cover the entire spectrum when it comes to technical savvy, according to Jay Hetherington, a 33-year veteran of the CIA who managed the National Signals Intelligence Department. High-ranking members of Al Qaeda — some of whom are doctors, computer scientists and mathematicians — are on the top end of that spectrum. Many security analysts say bin Laden, formally schooled in economics and business management, has excellent computer skills.

Far from laying low in mountain hideouts, Al Qaeda leaders have set up businesses that serve as fronts to buy needed technology, send messages, cover up Al Qaeda-related travel and raise money to fight their global Jihad.

Government prosecutors during this year's trial of the 1998 terrorist bombings of two U.S. embassies in Africa contended that top Al Qaeda officials led two lives, running the terrorist network while operating businesses selling gems or sugar cane or even operat-

## The technology behind th

**Osama bin Laden's Al Qaeda network uses a range of technology, but the U.S.-led coalition is on the lookout around the world, waiting for the terrorists' technology to give them away.**

### Al Qaeda:

**Members of bin Laden's terrorist network are reputed to be well-trained and technically savvy. They don't want the U.S. and its coalition allies to track them through the electronic footprints that cell phones, e-mail and even satellite phones leave behind. That means bin Laden and his top lieutenants shun the personal use of technology, passing missives and warnings through a network of human couriers. But the lower ranks of Al Qaeda, most hidden in cells that have infiltrated countries around the world, use all the technology available to them.**

### International communications

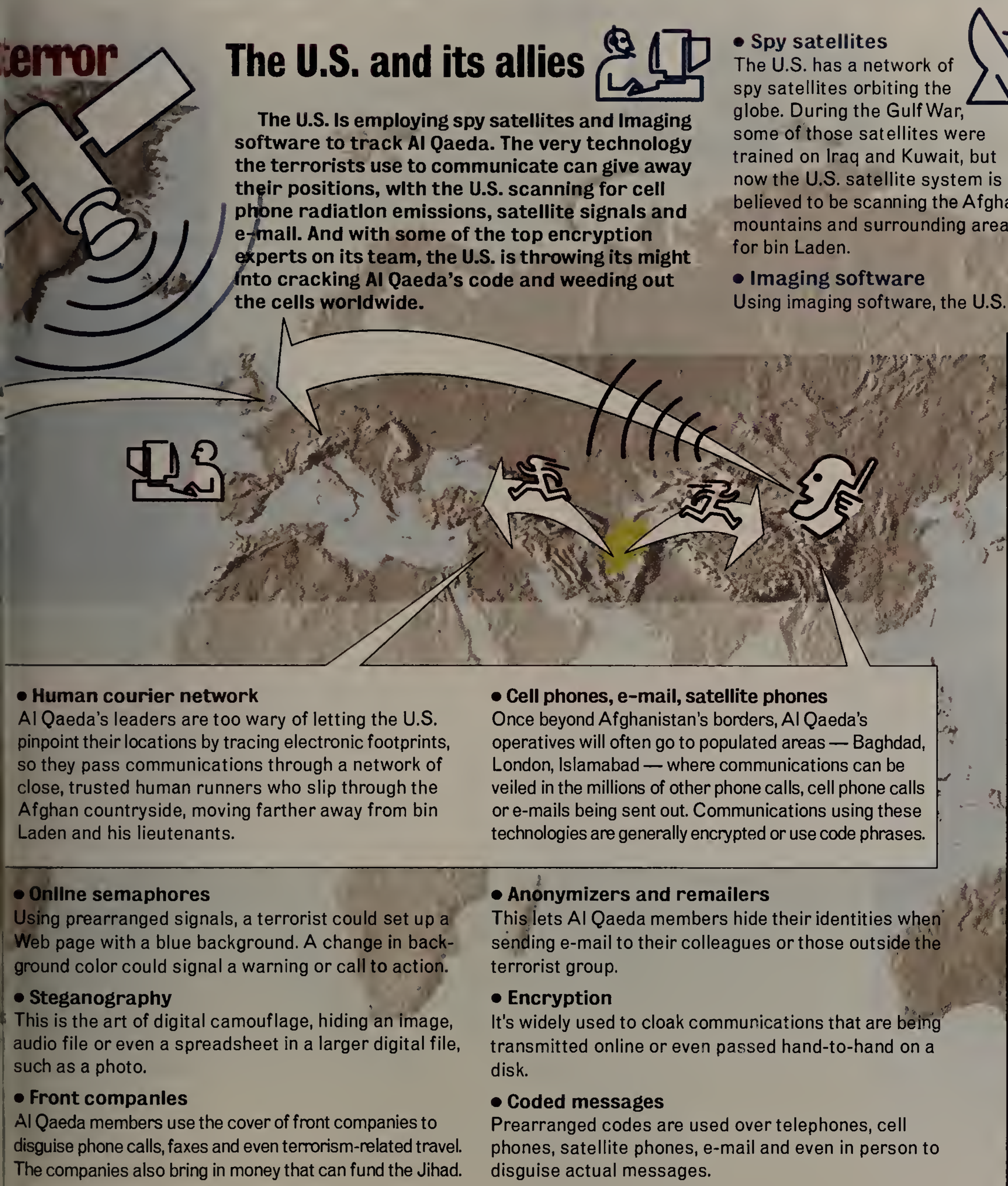
Members of Al Qaeda need to communicate with terroris cells in the U.S., Europe and elsewhere via a number of methods:

- **Online dead drops**
  This puts a digital spin on an old spy trick. Information or messages can be left in a company's open file server where a colleague can retrieve and delete them.

# network

## Al Qaeda suspected of using everything from advanced steganography over the Internet to couriers carrying messages across the desert.

■ BY SHARON GAUDIN



### The U.S. and its allies

**The U.S. is employing spy satellites and imaging software to track Al Qaeda. The very technology the terrorists use to communicate can give away their positions, with the U.S. scanning for cell phone radiation emissions, satellite signals and e-mail. And with some of the top encryption experts on its team, the U.S. is throwing its might into cracking Al Qaeda's code and weeding out the cells worldwide.**

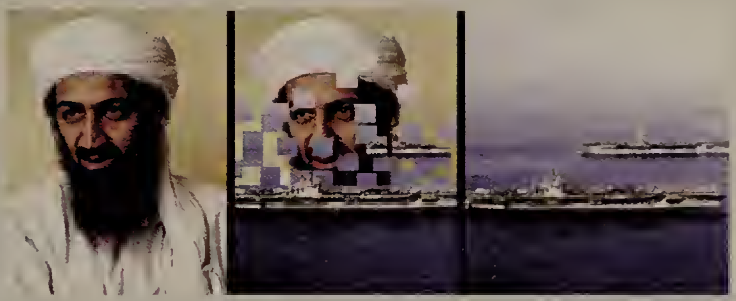
- **Spy satellites**
The U.S. has a network of spy satellites orbiting the globe. During the Gulf War, some of those satellites were trained on Iraq and Kuwait, but now the U.S. satellite system is believed to be scanning the Afghan mountains and surrounding areas for bin Laden.
- **Imaging software**
Using imaging software, the U.S. and its allies are able to pick out ground movement, such as transport trucks, tanks and troop movements.
- **Triangulating cellular signals**
By using three cellular towers, the source of a cell phone call can be pinpointed to within a few feet.
- **Electronic footprints**
Intelligence agencies around the world are watching for signal sources and even cellular radiation.

**Additional tracking methods**

- **Watching e-mail traffic**
- **Wire tapping**
- **Online tapping**
- **Monitoring software**
- **Decryption software**
- **Software to sniff out steganography**

- **Human courier network**
Al Qaeda's leaders are too wary of letting the U.S. pinpoint their locations by tracing electronic footprints, so they pass communications through a network of close, trusted human runners who slip through the Afghan countryside, moving farther away from bin Laden and his lieutenants.
- **Cell phones, e-mail, satellite phones**
Once beyond Afghanistan's borders, Al Qaeda's operatives will often go to populated areas — Baghdad, London, Islamabad — where communications can be veiled in the millions of other phone calls, cell phone calls or e-mails being sent out. Communications using these technologies are generally encrypted or use code phrases.

- **Online semaphores**
Using prearranged signals, a terrorist could set up a Web page with a blue background. A change in background color could signal a warning or call to action.
- **Steganography**
This is the art of digital camouflage, hiding an image, audio file or even a spreadsheet in a larger digital file, such as a photo.
- **Front companies**
Al Qaeda members use the cover of front companies to disguise phone calls, faxes and even terrorism-related travel. The companies also bring in money that can fund the Jihad.
- **Anonymizers and remailers**
This lets Al Qaeda members hide their identities when sending e-mail to their colleagues or those outside the terrorist group.
- **Encryption**
It's widely used to cloak communications that are being transmitted online or even passed hand-to-hand on a disk.
- **Coded messages**
Prearranged codes are used over telephones, cell phones, satellite phones, e-mail and even in person to disguise actual messages.



### Message in a bitmap

Steganography is thought to be among Al Qaeda's high-tech communication tools.

Steganography is the art of hiding information in plain sight. Some security and terrorism experts say soldiers inside the Al Qaeda terrorist network could be using steganography to send each other secret messages embedded in ordinary looking digital photos.

A variety of files, ranging from photos to text documents, audio and spreadsheets, can be hidden inside a simple digital photo, says Chet Hosmer, CEO or WetStone Technologies, a security company in Cortland, N.Y. There's a variety of steganography software available that will make tiny adjustments to the bits in an image and then insert the new file into open spaces.

The change is undetectable to the human eye, and the only way someone would know to check for a hidden message in a particular picture is if there were a predetermined type of picture to be on alert for. An operative might be told to watch for a picture of a brown-haired girl holding a flower, for instance. A software program would be used to scan the image for a hidden file and then extract it. The hidden file often would be encrypted, as well.

— Sharon Gaudin

PHOTOS: WETSTONE TECHNOLOGIES, INC

ing a juice bar.

From these businesses, they passed cryptic messages using land lines and fax machines, prosecutors said. One fax, intercepted by the U.S., was sent from the Islamabad Marriott in Pakistan. They even bought Adobe Acrobat software to manipulate images to make fake passport stamps. And under the cover of legitimate business, in 1996, an Al Qaeda member bought a satellite phone — and prepaid minutes — that was ultimately shipped to bin Laden.

In February 1998, before bin Laden gave up phone communication completely, he used that satellite phone to issue the fatwah, or edict, to kill American civilians.

"They've long used their businesses to communicate," says Thomas Gouttierre, who worked in Afghanistan with the United Nations and now is director for the Center for Afghanistan Studies at the University of Nebraska at Omaha.

"And they know we have the capability to intercept calls. They know and they make adjustments every day. . . . Calling someone and saying, 'I've got 17 tons of cane to go,' could mean it's time to take militant action. You wouldn't know that if you didn't already know the code," he says.

### Organized and clandestine

Government prosecutors, during the U.S. Embassy bombing trial, said Al Qaeda was organized around committees. And to keep its communications clandestine and secure, Al Qaeda even has a communications committee that decides which types of technology will be used to communicate internally and with those outside the group. Prosecutors said Al Qaeda even runs its own newspaper.

"There's this stereotype that they're Stone Age cavemen," says Richard Horowitz, a New York attorney and a former captain in the Israeli Army. "But they're professionals. These people are smart. . . Just because they don't have skyscrapers doesn't mean they're not good at high-tech things."

And Al Qaeda members have access to strong encryption software that gives their enemies two hurdles to overcome if their messages are intercepted — first decoding the digital encryption and then cracking cryptic code words and phrases that the encryption hides. Different cells would most likely use different forms of communication, different technology and different devices — all based on what is available in the area they have infiltrated. If cell phones are common in one area, that technology will be used so a call will be hidden in the noise coming from the millions of other calls in the region.

Some analysts, such as Enger, the former Air Force colonel, say some terrorist cells may be sending messages using steganography. Others could be putting a digital twist on an old spy game — dead drops.

Dion Stempfley, principal security engineer at security firm RipTech, and a former Emergency Response Team member with the Department of Defense, says terrorists are suspected of finding open file servers on corporate systems and turning them into a diabolical messaging service, leaving communications that can be retrieved and deleted without company IT workers even knowing they were there.

But most cell operatives probably are trained in more simple forms of secretive messaging, says Madsen, a 10-year Navy veteran.

A terrorist could set up a Web site of seemingly innocent family photos. If the normally blue background turns to green or if a picture is moved from the top to the bottom, it could be a warning that government investigators are closing in or it could be instructions to carry out an order, Madsen says.

## The myth of bin Laden

But no one is convinced that the old spy games have all gone digital.

"Great claims are part of the myth behind bin Laden," Madsen says. "Remember that the tools they used to conduct the Sept. 11 operation were Stone-Age tools — knives, wire transfers, written messages on pieces of paper. . . . The one reason they were successful in pulling this off is that they didn't use a lot of technology."

Whatever technology the members of Al Qaeda are using, the U.S. is using every technology within its grasp to scan for it.

"In almost every case, there is some sort of technical footprint that will help," says RipTech's Stempfley. "We just need to figure out how they are communicating. Once we know that, we can exploit it."

Stempfley says the U.S. and its allies are certainly using high-tech imaging tools and spy satellites to track ground movement of people and vehicles. He also says trackers are monitoring lines of communication all over the world, as well as scanning the Afghan countryside for any electronic or cellular emissions.

And to help follow the money trail, monitoring software identifies unusual trading patterns, and may have helped notify investigators that terrorists had worked the stock market to profit from the Sept. 11 attacks.

It's technology's double-edge sword that has Al Qaeda members nervous and continuously changing the means they use to communicate with one another.

"It starts low-tech at the top rungs and then goes high-tech the further you get out from the core," says Harvey Kushner, a military studies professor and author of "The Future of Terrorism: Violence in the New Millennium."

"They know how to use technology but ultimately they're afraid it will get them in trouble," he says. ■

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# Planning for the worst: Bring in the best

## Expert advice is available for drawing up disaster-recovery and business contingency plans.

■ BY KATHLEEN OHLSON

Thinking of overhauling your disaster-recovery plan? Fortunately, there are many companies that can give you some pointers.

The first step, of course, is acknowledging that disaster could affect you. "Never underestimate the human gift called denial," says Bruce Malik, an analyst at Gartner. "I think a lot of folks think they're luckier than average."

Next, recognize that there is a difference between business contingency and disaster recovery, and that plans for both are necessary. Business contingency means planning ahead for an emergency and identifying a plan to ensure critical networks and systems are up and running.

Disaster recovery, on the other hand, refers to a plan for reacting to an event.

Companies such as IBM Global Services' Business Continuity and Recovery Services, Comdisco and SunGard can help you formulate business contingency and disaster-recovery plans.

These organizations interview key personnel and evaluate network, system and recovery plans, if there are such plans. They then come back with recommendations.

When developing and implementing contingency and recovery plans, it's important to keep it simple, according to experts.

"Disaster-recovery planning is a complex task, but organizations make it more complicated by throwing everything but the kitchen sink into the plan," says Damian Walsh, Comdisco's senior vice president of professional services. The tendency is to spell out plans for everything — each unit, facility and employee, and "it becomes hundreds of pages," he says. "It's analysis paralysis."

Walsh says companies need to keep plans to one to two pages.

When an emergency occurs, consultants help companies restore operations by duplicating systems at a vendor's recovery site, shipping hardware replacements, moving operations and employees to hot sites, or bringing mobile centers to companies.

### Build it in

By automating data recovery, it becomes one less matter to worry about when disaster strikes. "You have to figure the senior technical people won't be available [to recover data], and people who are available will be inexperienced or not mentally ready to do the job," says Rick Weaver, BMC Software's product manager for OS/390 recovery and storage management. "You forget the human element, so you automate as much as possible."

Network management tool vendors — including BMC, Tivoli Systems and Hewlett-Packard — offer a range of software that can back up and recover data on databases, monitor performance, recognize when new devices join a network, and manage who accesses certain information.

Industry analysts say that up to 60% of a company's critical data is stored on individual laptops and desktops. Network executives looking for more control over PCs can turn to companies such as Connected, which provides software for automated desktop backup and recovery to rebuild users' systems, right down to the wallpaper.

"Disaster recovery is a labor of love that needs to be nurtured, but it's everybody's stepchild," says Lou Berger, a StorageNetworks executive. "It's done begrudgingly and not often done well."

### Where to turn

**Some of the organizations that specialize in business contingency and disaster recovery include:**

- **American Red Cross** www.redcross.org/services/disaster/beprepared/busi_industry.html
- **BMC Software** www.bmc.com/products/rmds/index.html www.bmc.com/products/rmos390/index.html
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- **Tivoli Systems** www.tivoli.com/products/solutions/availability/ www.tivoli.com/products/solutions/security/ www.tivoli.com/products/solutions/storage/products.html

Some businesses are turning to storage service providers (SSP), such as Sanrise, Storability and StorageNetworks, for help. SSPs manage data storage for customers at their headquarters or collocate storage with other service providers in major cities, providing primary or secondary back-up storage.

### Community organizations

Government and community organizations, such as the American Red Cross and the Federal Emergency Management Agency, help businesses when it comes to personnel issues during disasters.

Before a disaster strikes, they say businesses should find out about available resources from local community government liaisons; public, fire and police departments; telephone companies; and electric utilities.

Other recommendations include:

- Compile a phone list of key employees and customers, and provide copies to staff members. Create emergency call lists — preferably wallet size — of all persons on- or off-site who would be involved in an emergency, their responsibilities and contact information.
- Designate a phone number for recorded messages and provide that number to employees.
- Meet with insurance companies and assess the potential property, business and human interest impact of a disaster.
- Have building and site maps featuring the locations of utility shutoffs, gas lines, exits, stairways, designated escape routes, restricted areas and high-valued items.

In light of the terrorist attacks, many vendors have seen a dramatic increase in businesses seeking advice to revamp or create contingency and disaster-recovery plans.

"It's going to take a long time to forget those images, how it affected so many and the impact on businesses," BMC's Weaver says. Businesses are thinking about data protection beyond their own business, by expanding their supply, manufacturing and distribution contacts.

But StorageNetworks' Berger is skeptical about businesses' intentions for business contingency and disaster recovery.

"It'll likely wane in certain industries — and by December, you'll know who's serious about it when the budgets are made," he says. ■

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# Spending shifts

## IT resources are being shifted to disaster recovery and security, as total spending in 2002 will be limited because of the economic slowdown.

**■ BY NEAL WEINBERG**

The events of Sept. 11 have caused many IT executives to shift their spending priorities in 2002 toward disaster recovery, security and videoconferencing, but the weak economy is having a far greater impact on IT budgets than the terrorist attacks.

Those are some of the key findings from *Network World's* annual IT spending survey, which was expanded to include questions relating to the September attacks. A total of 598 IT professionals responded to the survey, which was conducted by Research Concepts of Berlin, Mass.

When it comes to overall spending for 2002, IT budgets appear to be inching up only 3.9%. That's a far cry from the 9.9% increase seen in 2001. Forty-two percent of this year's respondents say their 2002 spending is increasing, while 30% say their budgets will be flat and 28% are facing budget cuts.

Not surprisingly, only 35% of the IT professionals surveyed said that their 2002 budgets are adequate or more than adequate, while a sizeable majority — 65% — stated that their 2002 financial resources will be inadequate to handle the tasks at hand.

When asked which specific areas will receive more money in 2002, the top answer by far was security, which was listed by 62% of the IT professionals surveyed. Disaster recovery was named by 45% of respondents, followed by storage, wireless, servers, remote access/teleworkers, network management tools and LAN infrastructure.

Then we asked about the impact that Sept. 11 had on spending. Thirty-six percent said they'll be spending more on disaster recovery because of the attacks, 33% said they'll increase security spending, 17% plan to boost videoconferencing and 14% are looking at increased remote access investments specifically because of the events of Sept. 11.

But only 11% of respondents said they will receive additional money as a result of the September attacks, while 63% said there is no change in their budget, and 26% are shifting resources within their budget to areas that have become high priorities.

Finally, nearly 30% of IT professionals had to delay a technology upgrade slated for 2002. The most common upgrades that are being put on the back burner are operating system upgrades, enterprise applications such as customer relationship management or enterprise resource planning, wireless and infrastructure or backbone upgrades.

But IT professionals, by an overwhelming margin, said the upgrade delays are due to the economic slowdown, not to any budget shifting caused by Sept. 11. ■

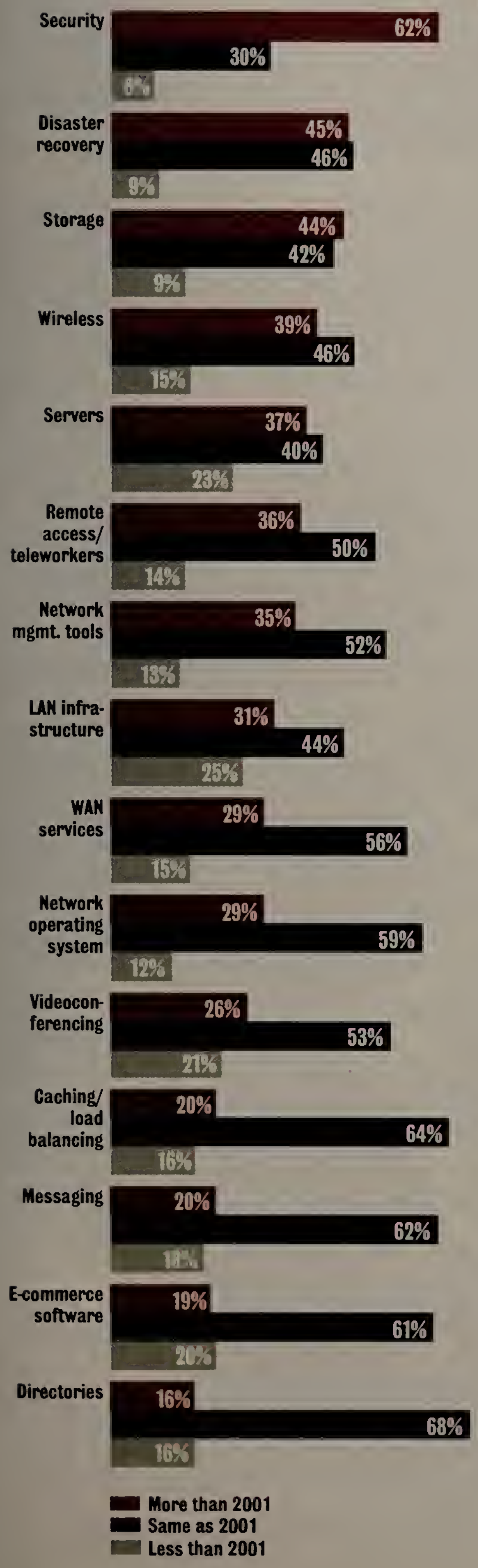
### Budget-stretchers

What steps are you taking to stretch your budget?

1. Delay purchases
2. Consolidate servers
3. Renegotiate contracts
4. Manage remotely
5. Move functions to the Web

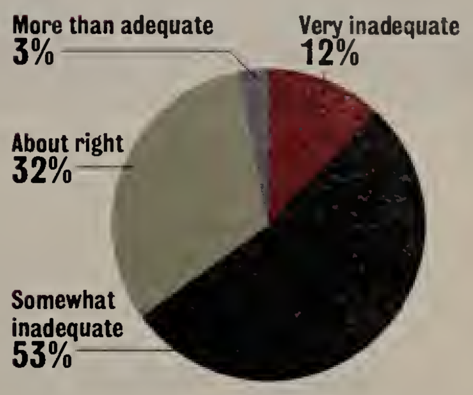
### Spending priorities

How will spending in 2002 compare with last year in these specific areas?



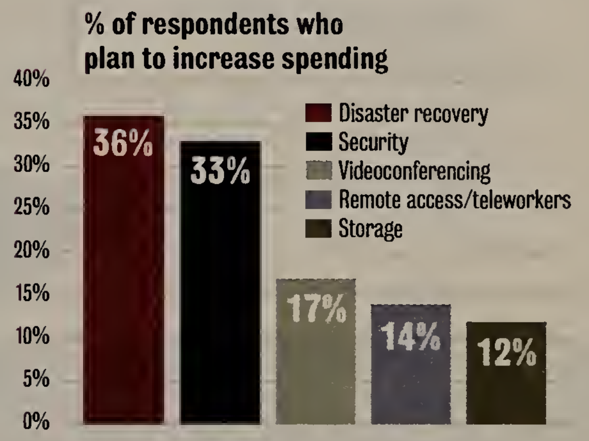
### Feelings of inadequacy

How do you feel about the financial resources you have relative to the tasks at hand?



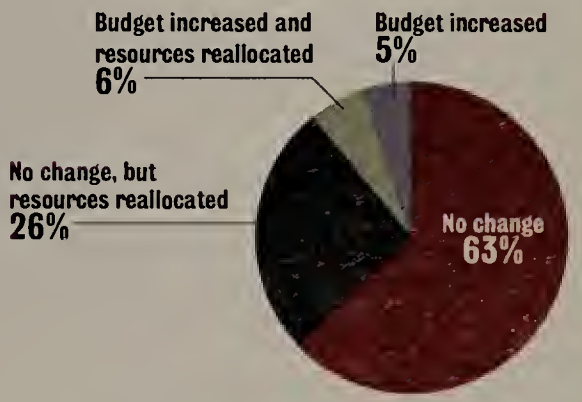
### Impact of 9/11

Did you decide to increase spending in any area as a result of Sept. 11?



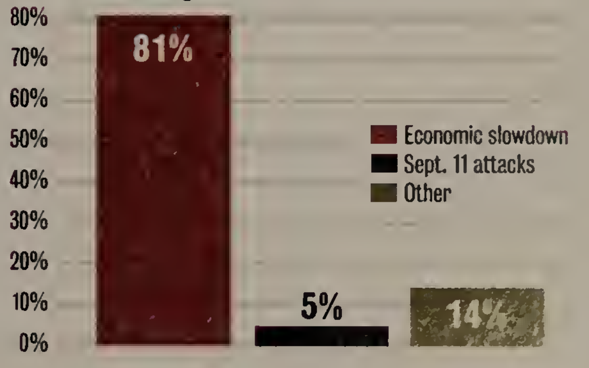
### Most budgets unchanged

How did the events of Sept. 11 change your budget?



### Upgrades delayed

Which factor caused upgrades to be delayed?



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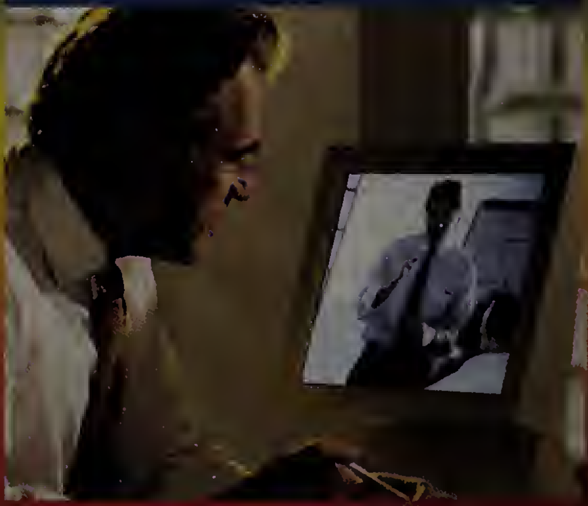

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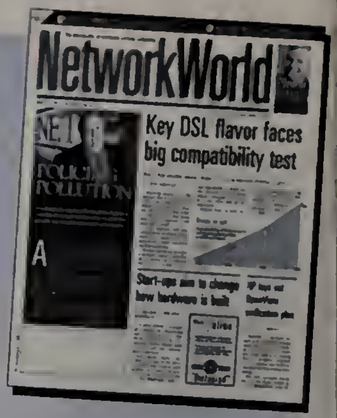
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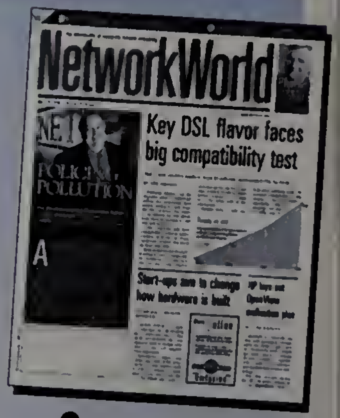
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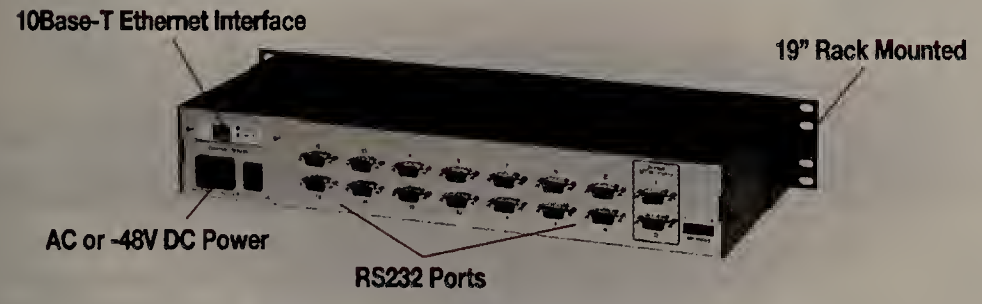

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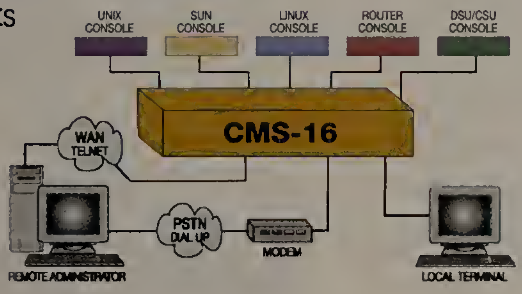

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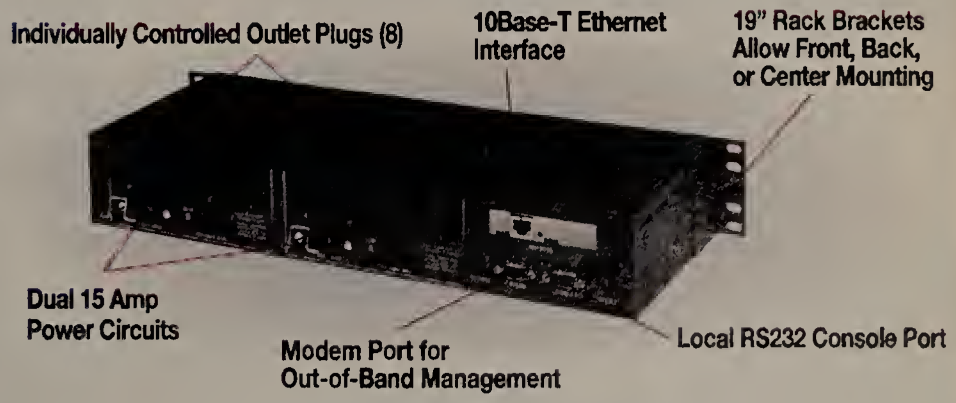
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**Asking successful companies about their diversity strategy frequently brings a moment of silence. For those who are succeeding, valuing diversity is no program of the month. It's a way of operating. "It's central to our business," says Andre Goodlett, associate director of staffing for Kellogg Co. "We do what is needed to attract and retain a pool of talented people. Our customer base is diverse so we make sure we are able to reflect that base and understand it."**

One look at **Kellogg's** web site pinpoints the second aspect of the hiring strategy at **Kellogg** – a friendly workplace. For IT professionals the web site represents something else.

**Kellogg** was among the first food companies to have a web site. Back in 1996 it sported an animated Tony the Tiger. Today, the site and the business are combining the elves of Keebler and Tony, there's a company store, community service links, games and a link to **Kellogg** Racing. The consolidation of Keebler and **Kellogg** is requiring new IT strategies, including an integrated SAP implementation.

Goodlett says **Kellogg** is hiring at a variety of levels, from PC and database support to leaders and managers for the implementation, which includes the majority of SAP modules. "We're rolling this out on a very aggressive timeline for all of the **Kellogg** U.S. business," he says. Positions currently open include business and technical analysts, senior programmer analysts, database management and administration.

"We need to attract people who want to work on infrastructure,as well as implement and maintain a large-scale enterprise system," Goodlett adds. "We're doing something new within **Kellogg** so every day presents something different in terms of challenges. That jazzes most people's interest. You can get some immediate gratification because everything we're doing will have a direct influence on the bottomline of the company's performance. There are tremendous opportunities here for gaining valuable experience and grow with us."

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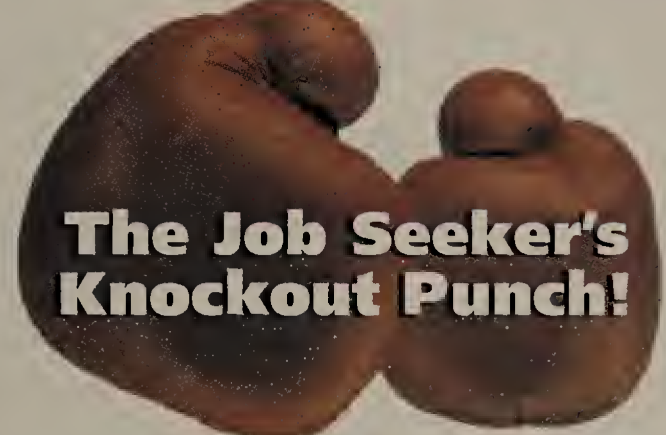

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## Editorial Index

3Com 23

**A**
Aprisma 10
AT&T 44
ATG 19

**C**
Cingular 26
Cirpack 27
Cisco 23, 27, 32
Click Commerce 19
CMGI 6
Compex 23
Computer Associates 8
ConfigureSoft 19
Covalent Technologies 19

**D**
Dell 11
D-Link Systems 11, 23
Documentum 19

**E**
EasyLink 1
Enterasys Networks 6
Equant 44
Equinix 44
Equipe Communications 27

**G**
Genuity 44
GoToMyPC 29
Groove Networks 29

**H**
Handspring 6

**I**
IBM 11, 19, 23, 25

**L**
Linksys 23

**M**
Microsoft 6

**N**
National Semiconductor 30
NetBotz 11
Netgear 11
Network Associates 8
NextWave 25
Nortel 11, 27

**P**
Palm 6
Plantraco 30

**Q**
Qlogic 11

**S**
SBC Communications 6
SMC 23
Starent Networks 27
Sybari 1

**V**
Verizon 44
VoiceStream 26

**W**
WorldCom 44

**X**
XDegrees 19
XLON Technologies 1

## Advertiser Index

| Advertiser | Page # | URL |
|---|---|---|
| Availability.com | 40 | www.a.com |
| Bay Technical Association | 55 | www.baytech.net |
| CDW Computer Centers Inc | 41 | www.cdw.com |
| Cisco Systems | 31 | www.cisco.com |
| Compaq Computer Corp | 43, 45, 47 | www.compaq.com |
| Computer Associates | 68 | www.ca.com |
| Dell | 21 | www.dell.com |
| EMC Corp | 18 | www.emc.com |
| Fluke Networks | 4 | www.fluke-net.com |
| Global Technology Associates | 57 | www.gta.com |
| Hergo Ergonomic Supplies | 57 | www.hergo.com |
| IBM | 28, 67 | www.ibm.com |
| Intel Corp | 14-15, 34-35 | www.intel.com |
| McData Corp | 38 | www.mcdata.com |
| Net Optics Inc | 54 | www.netoptics.com |
| Network Instruments | 58 | www.networkinstruments.com |
| Nokia Internet Communications | 22 | www.nokia.com |
| Powerquest Corp | 12 | www.powerquest.com |
| Raritan Computer | 55 | www.raritan.com |
| Recortec Inc | 59 | www.recortec.com |
| Riverstone Networks | 17 | www.riverstonenet.com |
| Rose Electronics | 56 | www.rose.com |
| Sharkrack | 56 | www.sharkrack.com |
| SNMP Research | 55 | www.snmp.com |
| Storagetek | 9 | www.storagetek.com |
| Sun Microsystems Inc | 2-3 | www.sun.com |
| Telco Systems Inc | 7 | www.telco.com |
| VBrick Systems | 58 | www.vbrick.com |
| Veritas | 24 | www.veritas.com |
| Western Telematic Inc | 59 | www.wti.com |
| World Data Products | 59 | www.wdpi.com |

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*Network World*, 118 Turnpike Road, Southborough, MA 01772-9108, (508) 460-3333.

Periodicals postage paid at Southborough, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by *Network World*, Inc., 118 Tumpike Road, Southborough, MA 01772-9108.

*Network World* is distributed free of charge in the U.S. to qualified management or professionals.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on the information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-490-6444.

Nonqualified subscribers: $5.00 a copy; U.S. - $129 a year (except Washington, DC,$136.74); Canada - $160.50 (including 7% GST, GST#126659952); Central & South America - $150 a year (surface mail); Europe - $205 a year (surface mail), all other countries - $300 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

*Network World* can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

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POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

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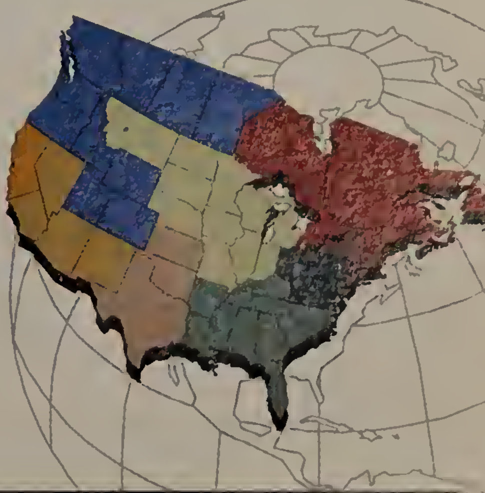

## BackSpin Mark Gibbs

# No scalability and no clues

*Your Nov. 5 column sounded good — until I came to the unrealistic part. "Why does that guy in admin have a 750-MHz PC with 500M bytes of RAM?" The same reason he has the corner office and the company car and the big expense account, and the engineers and IT people don't have any of that.*

*Unless you have a plan to erase 50 years of mindless corporate culture that downgrades techies and lavishes managers, the suggestion to have the admin guy "do more with less" is likely to lead to somebody getting fired. . . . Maybe it was better when managers didn't have computers at all.*

— A faithful reader responding to "Doing more with what you have," (www.nwfusion.com, DocFinder: 7043)

What an interesting idea! Maybe it was better when managers didn't have computers at all . . . but then again, no one else did.

It is an old truism that computers are both a boon and a hindrance. What you gain on the business roundabout you lose on the swings of IT overhead. The way it usually works is that along with each PC that should improve your business effectiveness, you take on a chunk of overhead in support staff, management and maintenance, and there's not even economy of scale as you get more PCs!

The problem is that as your PC population increases, new overheads appear. Rolling out software updates is no problem with 20 users, but once you get up to the hundreds, life gets complicated. A few users generate a level of X problems, but double the number of users and you don't get 2X problems, but as much as X squared!

The reason for this curious scaling without scalability lies in the nature of computer equipment. Individual computers when joined together stop being discrete systems in and of themselves; when you network them you get something that looks, in many respects, like a huge computer — orders of magnitude more complex than the sum of its parts.

Now there are technology solutions that can mitigate these problems. Using low-cost client PCs as terminals to access large, centralized, shared multiuser servers (as in Microsoft Windows NT Server 4.0, Terminal Server Edition or Linux/Unix X Window servers) is a great way to reduce the support overhead that comes with each fully loaded PC. But that's not enough.

What else is needed? End users have to learn how to use their PCs. You might argue that PCs are now more technical and harder to understand, but they are also much easier to use. Unless, of course, you are clueless. And this is the nub of most of the stories I hear from support people — not how Bob in accounting screwed up his registry while trying to customize the behavior of Outlook. The stories are instead about how Bob managed to delete all his files due to his brain going into vapor lock at the sight of a message asking "Are you sure you want to delete these 1,376 items?"

If you check out help-wanted ads for white-collar positions, you'll see that most companies seek computer-literate applicants. But do employers establish that applicants are indeed computer-literate before hiring them? Usually not.

The majority come onboard with a few years of Word and Excel under their belts and as soon as they are asked to do something more exotic than open a new spreadsheet to add a column of numbers, they adopt that "deer in the headlights" look that declares they are, for practical purposes, computer-illiterate.

As for existing staff, we give them training but rarely do we give them literacy. They don't want it because there is usually no incentive that makes it worth their while to get a clue.

If we don't make the user population capable, the support and maintenance overhead is wasting the advantage of being computerized. And we can then be considered just as clueless.

*Give a clue to nwcolumn@gibbs.com.*

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## 'NetBuzz News, insights, opinions and oddities

**Paul McNamara**

### Dipping into the 'Net Buzz e-mailbag

Time again to let readers take control of the soapbox.

A customer's gripe about Priceline.com's policy on mistakenly ordered airline tickets — basically, you're stuck with them — drew mixed reactions, not all sympathetic.

"The Internet created new ways to find bargains, but it didn't really create anything new about bargain hunting," Charles Garratt writes. "The Priceline plane tickets you mentioned can go in the closet with the pair of shoes that didn't fit but was too good a buy to pass up."

"These are not Internet issues, they are people issues," Garratt says. "Finding bargains is faster because of the Internet, but then so is making mistakes."

Another reader insists the onus for the botched transaction belongs squarely on the buyer's big fat head.

"I just don't get why everyone knocks Priceline.com," Gail Frawley writes. "Besides the numerous warnings Priceline gives during the purchase process, anyone who uses the site has a responsibility to check out the terms before purchasing. If people are too stupid to put the correct dates in, well, what can I say? I don't have a lot of sympathy for them."

An item about Microsoft's regrettable decision to render the thesaurus in Word politically correct and utterly useless drew this advice:

"I can see you miss the thesaurus," writes a reader who asked that his name not be published. "I recommend trying out [Sun's] Star Office. It has a thesaurus that doesn't care about political correctness and is about one-tenth the price of Microsoft Office — free if you download rather than order CDs."

Something tells me the *Network World* IT department may not appreciate that suggestion.

My own tale of woe about trying — and failing — to buy a car over the Internet was not well received by one reader.

"Buying a car over the Internet was a poor choice to show why online buying isn't taking off," Alan M. writes. "The primary reason [for poor car-buying experiences online] is that the state and national auto dealers' associations have fought hard to keep the buying process within their paradigm — in other words, with the buyer at a serious disadvantage in the showroom. The dealers don't want you to be able to easily buy a car."

"Next time try a more salient and germane example to illustrate the point," he adds.

I'm not sure Alan got *my* point — shopping online is still too complex — but his own about the car business certainly can't be dismissed.

Finally, my request for accounts of personal experiences with ticket-buying site Fandango drew a couple of rave reviews.

"I used Fandango for ordering tickets to 'Harry Potter' and I was very impressed with the service," writes Russ Weimer. "I received my confirmation within minutes and had tickets — in advance — for shows that were sold out when we arrived at the theater. . . . I would highly recommend this site for its convenience and the ability to buy tickets in advance — especially for this particular movie."

Another reader's account seconds that assessment, although it's not exactly firsthand.

"I purchased nine tickets for the movie 'Harry Potter' via Fandango.com," Jed Dineen reports. "My wife and eight 12-year-old girls attended the movie on Saturday afternoon."

Which has to qualify Mrs. Dineen for some kind of medal and raises the question of how Jed managed to negotiate that particular division of labor.

"The Framingham, Mass., General Cinema accepted the tickets without a blink," he adds. "Everything worked flawlessly [and] I will use this service again."

Bet he gets to take the kids next time.

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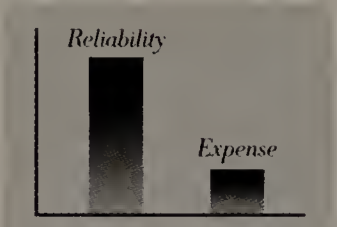

*Fig. 1. iSeries Value Proposition.*

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*Fig. 2. Happy CFO.*

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